PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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RCA Victor — 21-CS-7815-U, 21CS7817-U: — 328-14-5

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 237

GENERAL ELECTRIC MODELS UHF-21C225, UHF-21C226, UHF-21C227, UHF-21C228, UHF-21C229, UHF-21C230, UHF-21C231, UHF-21C232, UHF-21C233, UHF-21T20, UHF-21T21

General Electric models 21C225, 21C226, 21C227, 21C228, 21C229, 21C230, 21C231, 21C232, 21C233, 21T20 and 21T21 were covered in Photofact Folder 7 — Set 237.

Models UHF-21C225, UHF-21C226, UHF-21C227, UHF-21C228, UHF-21C229, UHF-21C230, UHF-21C231, UHF-21C232, UHF-21C233, UHF-21T20 and UHF-21T21 are electrically identical to the models covered, except for the addition of a UHF tuner (part #UHF-90).

Proper dial cord stringing for UHF-90 is shown below.

A schematic of tuner UHF-90 is given on the reverse side.

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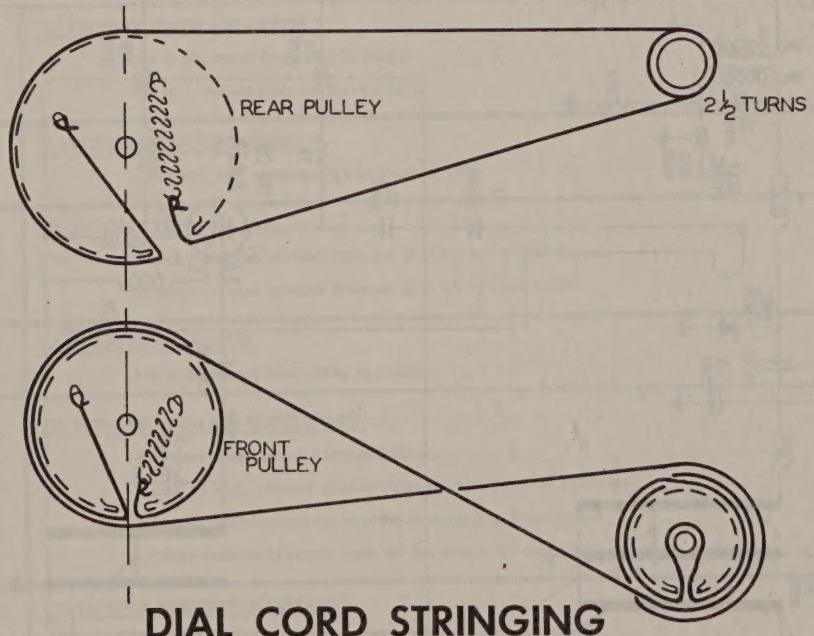
PRODUCTION CHANGES
BULLETIN 165

PRODUCTION CHANGES
BULLETIN 165




DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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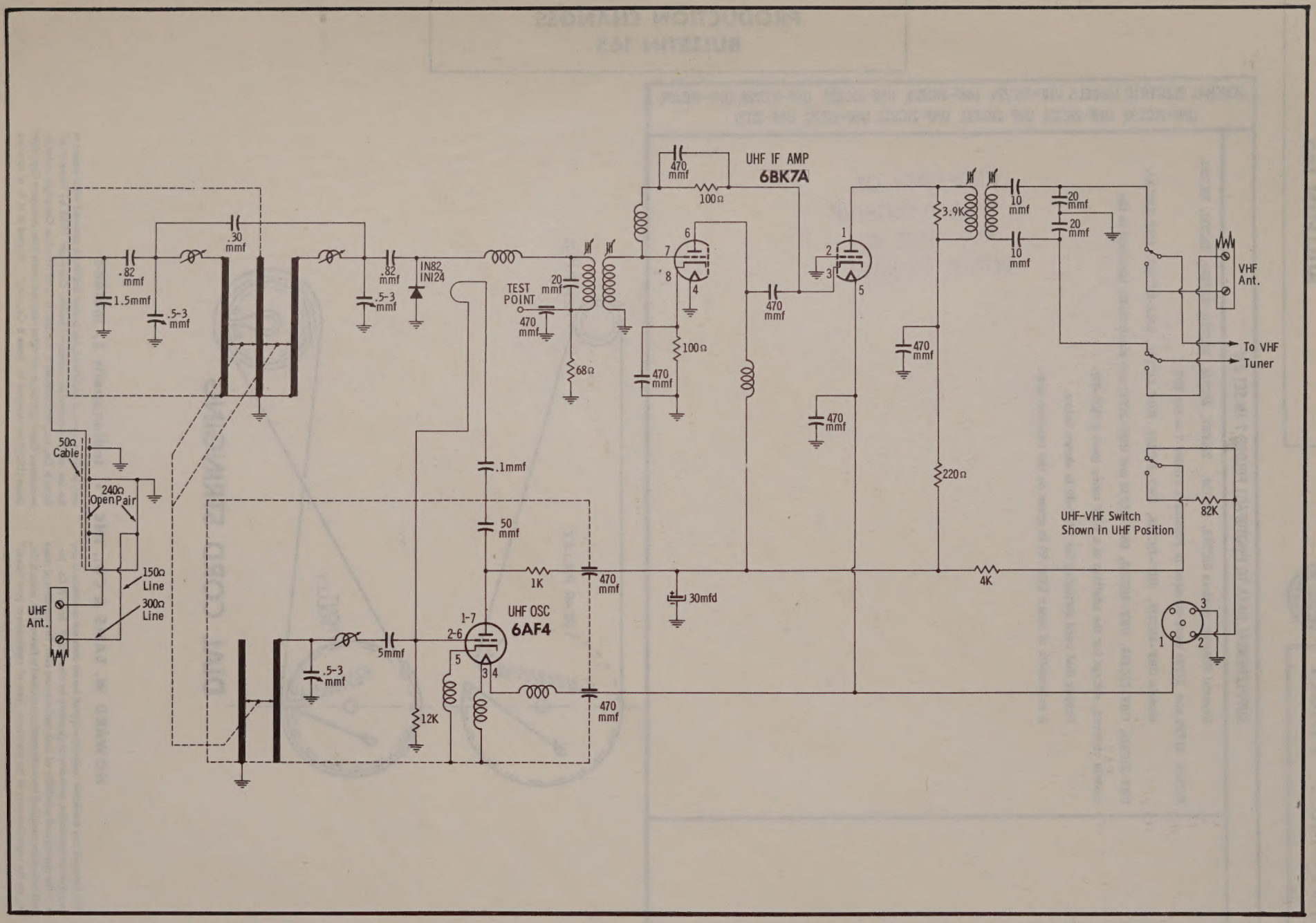
UHF IF AMP
6BK7A
470 mmf
100Ω
.30 mmf
.82 mmf
1.5mmf
.5-3 mmf
.82 mmf
.5-3 mmf
IN82, IN124
TEST POINT
20 mmf
470 mmf
68Ω
100Ω
470 mmf
470 mmf
470 mmf
3.9K
10 mmf
20 mmf
20 mmf
10 mmf
VHF Ant.
To VHF Tuner
470 mmf
220Ω
50Ω Cable
240Ω Open Pair
150Ω Line
300Ω Line
UHF Ant.
.1mmf
50 mmf
1K
470 mmf
30mfd
4K
82K
UHF-VHF Switch Shown in UHF Position
UHF OSC
6AF4
1-7
2-6
5mmf
.5-3 mmf
12K
470 mmf

## SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 4 IN SET 310

General Electric models 14T016, 14T017, 14T018 ("Q" Line)

General Electric models 14T007, 14T008, 14T009, 14T010, 14T011 and 14T012 ("M" Line) were covered in Photofact Folder 4 - Set 310.

Models 14T016, 14T017 and 14T018 ("Q" Line) are electrically identical to the models covered, except for the following changes.

HORIZONTAL MULTIVIBRATOR CIRCUIT REVISED

V10 is changed from a 7AU7 to a 6CG7. The horizontal multivibrator circuit is revised, and a partial schematic is given on the reverse side.

COMPONENT CHANGE

C25 is increased from 82MMF to 91MMF.

(Con't. on Reverse Side)

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## SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 15 IN SET 316

TRUETONE MODELS 2D1520A, 2D1521A, 2D1522A, 2D1522B, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33)

Truetone models 2D1520A, 2D1521A, 2D1522A, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33) were covered in Photofact Folder 15 — Set 316.

Model 2D1522B is electrically identical to model 2D1522A and is added, along with late production changes, with the publication of this bulletin.

TO IMPROVE TUNER AGC ACTION

R44 is decreased from 1Meg to 680KΩ.

R45 is increased from 390KΩ to 470KΩ.

TO INCREASE HORIZONTAL SIZE

A 22MMF, 5KV capacitor is added across C86.

TO PROTECT LIFE OF C.R.T.

An 82KΩ resistor is added from pin 10 of V17 to the 245V line.

An 82KΩ resistor is added from pin 10 of V17 to boost (530V).

TO IMPROVE AGC ACTION

R20 is decreased from 10Meg to 8.2Meg.

TO IMPROVE VIDEO AND REDUCE SNOW

R21 is increased from 1.2 Meg to 1.8Meg.

A 15KΩ, 1 watt, resistor is added from pin 8 of V6 to the 245V line.

A 5MFD, 300V electrolytic is added from pin 8 of V6 to ground.

A 10Meg resistor is added from the low side of R9 (tuner AGC control) to ground.

TO IMPROVE HORIZONTAL LINEARITY

Two anti pin-cushion magnets are added (part #201-26614).

TO REDUCE AUDIO HUM

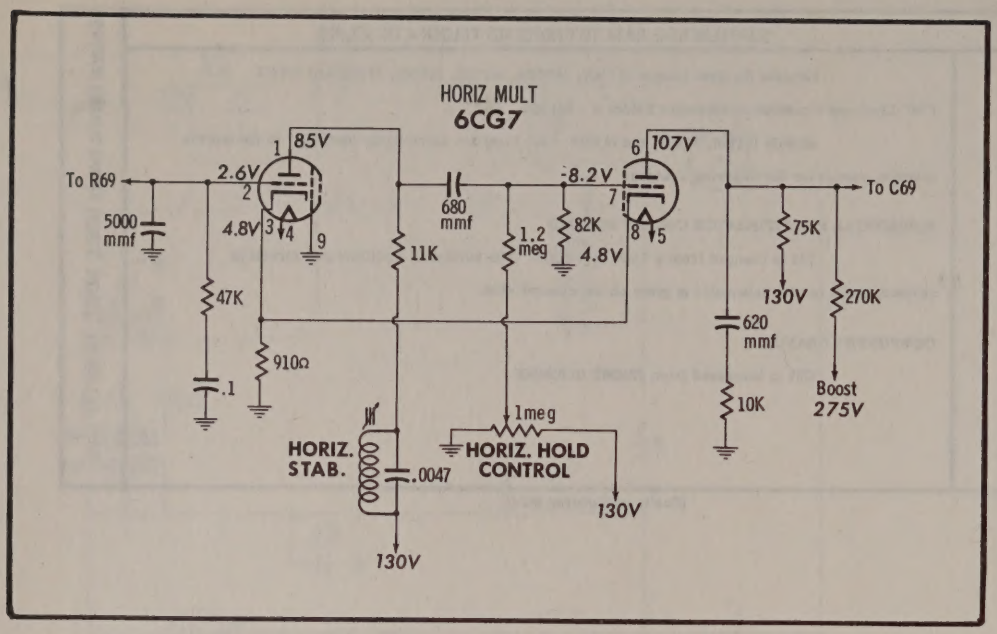
The primary of T5 (audio output transformer ) is rewired from the 260V line to the 245V line.

TO ELIMINATE AUDIO BUZZ

R48 is decreased from 470KΩ to 100KΩ.

C56 is omitted.

(Con't. on Reverse Side)




| | |
|---|---|
| | TO INCREASE HORIZONTAL SIZE AT 105VAC<br>The damper tube (V15) is changed from a 6AX4 to a 6AU4.<br>The blue lead of the deflection yoke (pin 3 of T4) is removed from terminal 2 of T2 and reconnected to terminal 3 of T2.<br>The 22MMF capacitor added previously in parallel with C86 is omitted. |
| | COMPONENT CHANGES<br>R100 is increased from 470KΩ to 820KΩ.<br>R97, R98, R99 and C89 are omitted. |
| | TO ELIMINATE SNIVITS INTERFERENCE<br>C82 is decreased from .047MFD to 820MMF. |

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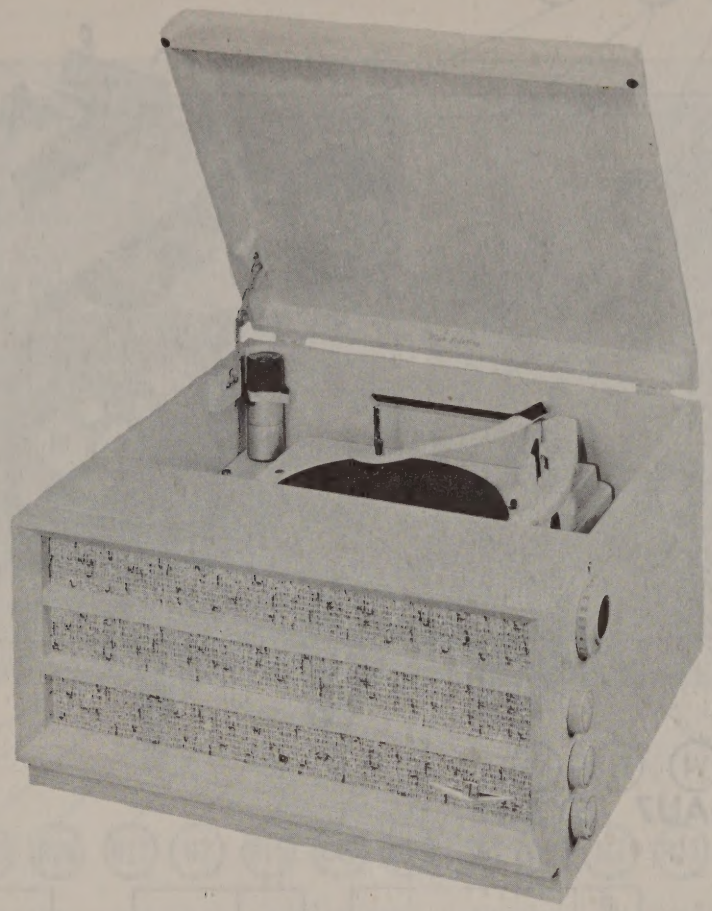
AIRLINE
MODEL 2509



AIRLINE
MODEL 2509

| | |
|---|---|
| TRADE NAME | Airline Model 2509 |
| SUPPLIER | Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill. |
| TYPE SET | AC Operated AM Superheterodyne Receiver with 4 Speed Automatic Record Changer |
| TUBES (Six) | Types 6BE6 Converter, 6BA6 IF Amplifier, 6AV6 Det.-AVC-AF Amp., 12AU7 AF Amp.-Phase Inv., 6BL7GT Output, 5Y3GT Rectifier |
| POWER SUPPLY | 110-120 Volts AC-60 Cycles — RATING .58 Amp. @ 117 Volts AC |
| TUNING RANGE—BROADCAST | 540KC-1625KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .01MFD | High side to pin 7 (grid) of 6BE6 (V1). Low side to chassis. | 455KC (400~ Mod.) | Tuning gang fully open | Across Voice Coil | A1, A2, A3, A4 | Adjust for maximum output. |
| 2. | " | " | 1625KC | " | " | A5 | " |
| 3. | | Loop | 1400KC | Tune to 1400KC signal | " | A6 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |

FOR SERVICE INFORMATION ON RECORD CHANGER—SEE SIMILAR V-M MODEL 1200—PHOTOFACT SET 290—FOLDER 11 OR RECORD CHANGER MANUAL CM-7.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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G436

# PARTS LIST AND DESCRIPTIONS

AIRLINE MODEL 2509

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | Converter | 6BE6 | |
| V2 | IF Amplifier | 6BA6 | |
| V3 | Det.-AVC-AF Amp. | 6AV6 | |
| V4 | AF Amp.-Phase Inv. | 12AU7 | |
| V5 | Output | 6BL7GT | |
| V6 | Rectifier | 5Y3GT | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA AIRLINE PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ▲40 | 350 | | AFH3-43 | C034 | FP376.8 | TMT38 | T-165 | TVL-3785 |
| B | ■40 | 350 | | | | | | | |
| C | ▲10 | 350 | | | | | | | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA AIRLINE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C2 | .1 | 200 | | P288N-1 | DF-104 | CUB2P1 | | PT401 | 2TM-P1 | |
| C3 | .05 | 400 | | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C4 | .05 | 400 | | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C5 | 100 | | | BPD-0001 | D6-101 | G042 | 801-101 | UC-531 | 5GA-T1 | |
| C6 | 33 | | | N750-DI33 | TCN-33 | N029 | N750K-330 | NT-5433 | 5TCU-Q33 | |
| C7 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C8 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C9 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C10 | 2000 | | | BPD-002 | DD-202 | K072 | 801-002 | DC-522 | 5HK-D2 | |
| C11 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C12 | .022 | 400 | | BPD-02 | DF-203 | CUB4S22 | 817-02 | PT4122 | 4TM-S22 | |
| C13 | .022 | 400 | | BPD-02 | DF-203 | CUB4S22 | 817-02 | PT4122 | 4TM-S22 | |
| C14 | 2.0 | 50 | | | | | | | | |

## CONTROLS

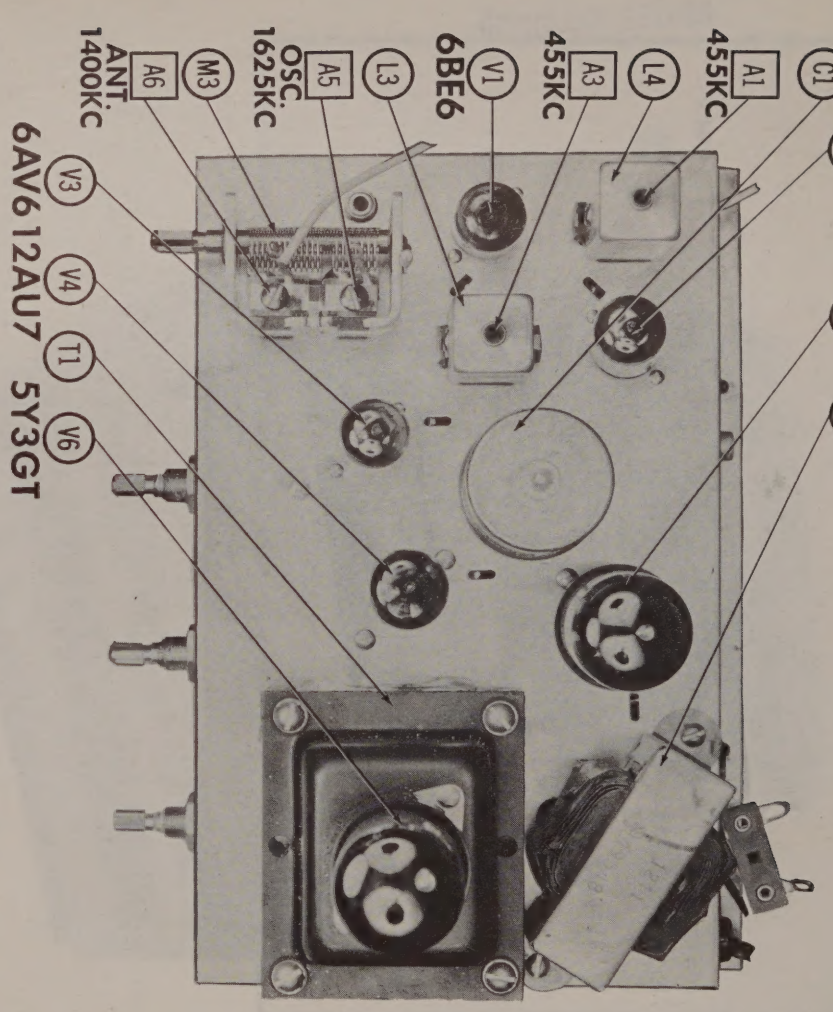
| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA AIRLINE PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 500K | ½ | 412 | AB-60 | | | | Bass |
| B | Shaft | | Not Req. | AK-4 | | | | Attach to R1A. |
| C | Switch | | Not Req. | KB-1 | | | | Attach to R1A. |
| R2 | 500K | ½ | 411 | | | | | Treble & Switch |
| R3A | 2.5Meg | ½ | 401E | ABT-79 | | | | Loudness-Tapped at 400K |
| B | Shaft | | Not Req. | AK-4 | | | | Attach to R3A. |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | REPLACEMENT DATA AIRLINE PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R4 | 22K | | | BTS-22K | |
| R5 | 3300Ω | 1 | | BTA-3300 | |
| R6 | 270Ω | | | BTS-270 | |
| R7 | 3300Ω | 1 | | BTA-3300 | |
| R8 | 2.2Meg | | | BTS-2.2Meg | |
| R9 | 47K | | | BTS-47K | |
| R10 | 470K | | | BTS-470K | |
| R11 | 47K | | | BTS-47K | |
| R12 | 10Meg | | | BTS-10Meg | |
| R13 | 270K | | | BTS-270K | |
| R14 | 47K | | | BTS-47K | |
| R15 | 470K | | | BTS-470K | |
| R16 | 180K | | | BTS-180K | |
| R17 | 100K | | | BTS-100K | |
| R18 | 120K | | | BTS-120K | |
| R19 | 470Ω | | | BTS-470 | |
| R20 | 100K | | | BTS-100K | |
| R21 | 120K | | | BTS-120K | |
| R22 | 470Ω | | | BTS-470 | |
| R23 | 6800Ω | 1 | | BTA-6800 | |
| R24 | 220K 5% | | | BTS-220K 5% | |
| R25 | 18K 5% | | | BTS-18K 5% | |
| R26 | 220K 5% | | | BTS-220K 5% | |
| R27 | 330Ω | 1 | | BTA-330 | |
| R28 | 2200Ω | | | BTS-2200 | |
| R29 | 1500Ω | 2 | | BTB-15K | |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | AIRLINE PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 117VAC @ .58A | 535VCT @ .070A | 5VAC @ 2A | 6.3VAC @ 2.75A | 1106 | | | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | AIRLINE PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | 7KΩ | 6-8Ω | 1211 | Z1011 | A-2901 | A-3870 | 22S58 | S-55X | |

## SPEAKER

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | AIRLINE PART No. | QUAM PART No. | RCA TYPE No. | |
| SP1 | 8" | PM | 6-8Ω | 2633-A | 8A4 | 208S4 | |
| SP2 | 3½" | PM | 14Ω | 2633 | 3A15T | | |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | AIRLINE PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Loop Stick | .5Ω | | | | | | |
| L2 | Osc. Coil | 7Ω | | | | | | Tapped @ .6Ω |
| L3 | Input IF | 13Ω | 13Ω | 1405 | 16-6758 | BC-352 | 12-C1 | |
| L4 | Output IF | 13Ω | 13Ω | 1406 | 16-6758 | BC-353 | 12-C2 | |

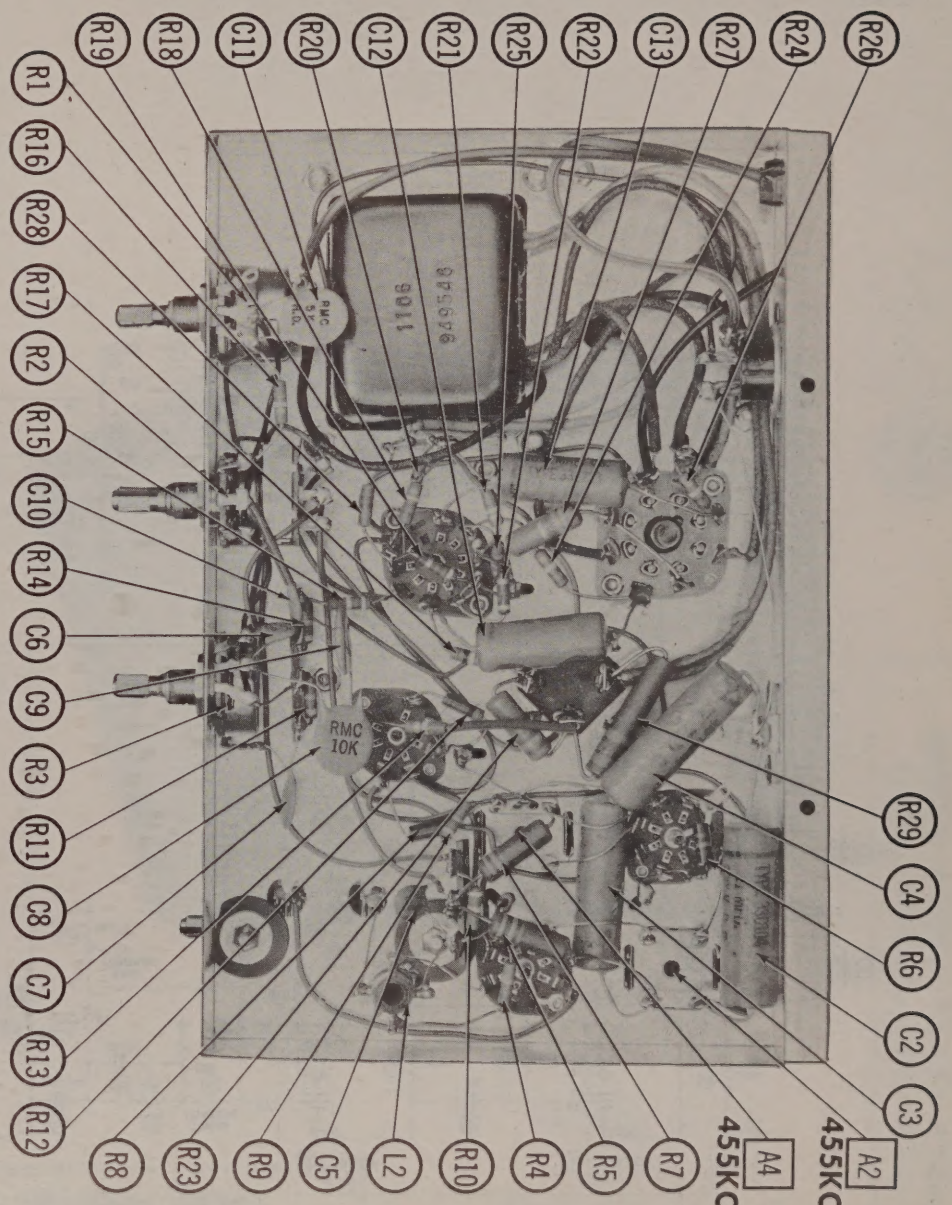
## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA | | | | | REMARKS |
|---|---|---|---|---|---|---|
| | AIRLINE PART No. | ASTATIC PART No. | | ELECTRO-VOICE PART No. | | |
| | | CARTRIDGE | NEEDLE | CARTRIDGE | NEEDLE | |
| M1 | | | | 56 | | |

## MISCELLANEOUS

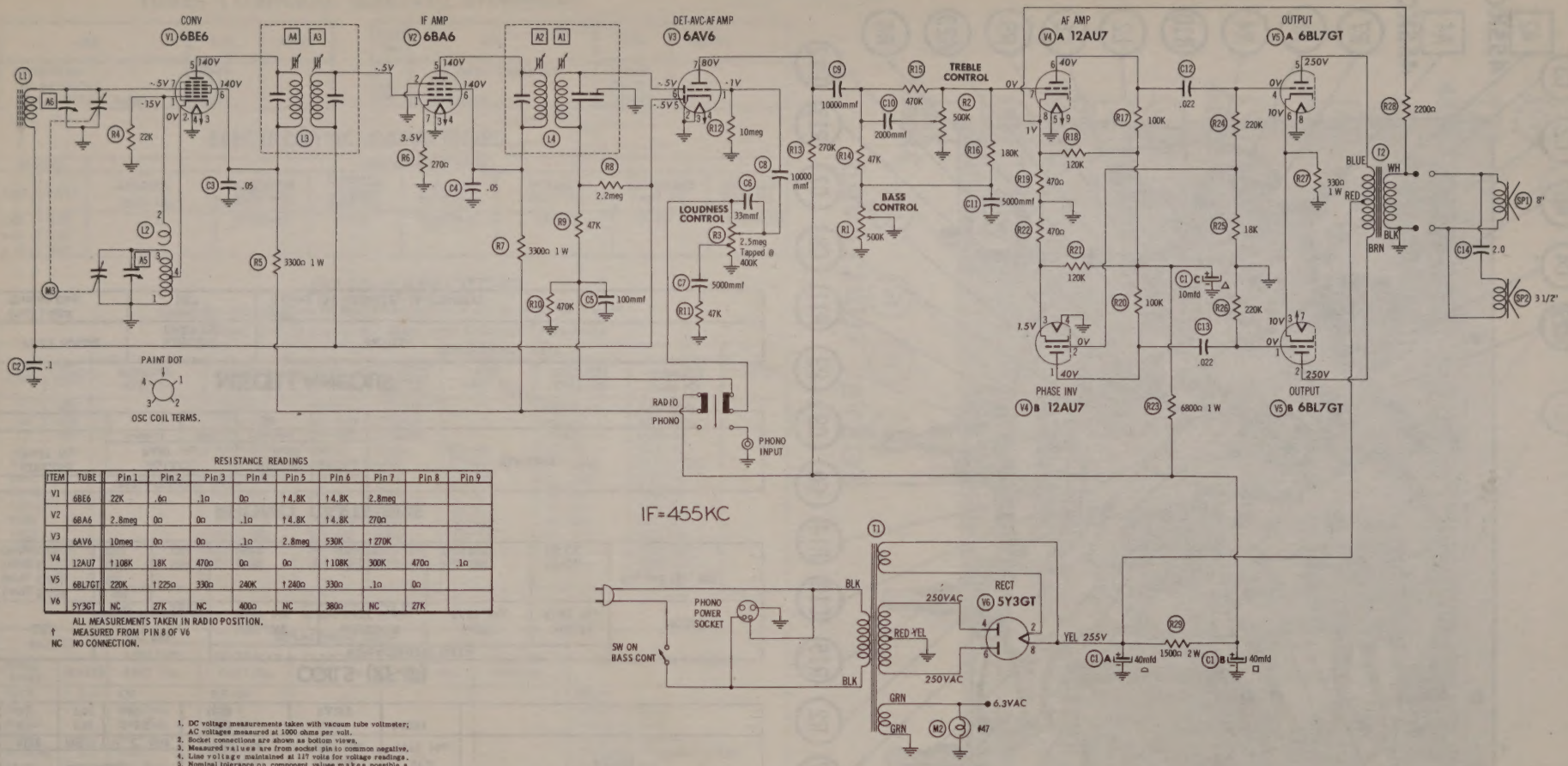
| ITEM No. | PART NAME | AIRLINE PART No. | NOTES |
|---|---|---|---|
| M2 | Dial Light | | #47 |
| M3 | Tuning Cap. | 1017 | 2 Gang (34-435MMF, 13-105MMF) |

# CHASSIS—BOTTOM VIEW




SET 328 FOLDER 2

AIRLINE MODEL 2509




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6BE6 | 22K | .6Ω | .1Ω | 0Ω | †4.8K | †4.8K | 2.8meg | | |
| V2 | 6BA6 | 2.8meg | 0Ω | 0Ω | .1Ω | †4.8K | †4.8K | 270Ω | | |
| V3 | 6AV6 | 10meg | 0Ω | 0Ω | .1Ω | 2.8meg | 530K | †270K | | |
| V4 | 12AU7 | †108K | 18K | 470Ω | 0Ω | 0Ω | †108K | 300K | 470Ω | .1Ω |
| V5 | 6BL7GT | 220K | †225Ω | 330Ω | 240K | †240Ω | 330Ω | .1Ω | 0Ω | |
| V6 | 5Y3GT | NC | 27K | NC | 400Ω | NC | 380Ω | NC | 27K | |

ALL MEASUREMENTS TAKEN IN RADIO POSITION.
† MEASURED FROM PIN 8 OF V6
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PHOTOFACT* Folder

# BENDIX MODELS K2250, K2251, T2150, T2151 (Ch. T20, T20-1)

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Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

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DENVER, COLORADO

BENDIX MODELS K2250, K2251, T2150, T2151 (Ch. T20, T20-1)

BENDIX MODEL K2250

| | |
|---|---|
| TRADE NAME | Bendix Models K2250, K2251, T2150, T2151 (Ch. T20, T20-1) |
| MANUFACTURER | Bendix Radio, Div. of Bendix Aviation Corp., Baltimore 4, Md. |
| TYPE SET | Television Receiver |
| TUBES | Nineteen |
| POWER SUPPLY | 110-120 Volts AC-60 Cycles RATING 1.64 Amp. @ 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) |

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RETMA MEMBER

# BENDIX MODELS K2250, K2251, T2150, T2151 (Ch. T20, T20-1)

MODELS CHASSIS

K2250, K2251, T2150, T2151 ..... T20, T20-1

## DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from front panel of cabinet.

2. Remove 8 wood screws and 1 metal screw Remove rear cover.

3. Remove 2 wood screws holding antenna terminal bracket.

4. Remove picture tube socket, yoke plug, HV lead and speaker leads.

5. Remove 5 chassis bolts. Remove chassis.

6. Remove 5 speaker nuts. Remove 2 speakers.

## SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of VHF tuner oscillator adjustments, it is necessary to remove the chassis from the cabinet. (See alignment instructions on pages 6 and 7).

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 wood screws holding metal molding at top edge of the safety glass. Remove metal molding and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator is located on the rear apron of the chassis.

Set the horizontal hold control at the center of its range and adjust the horizontal oscillator slug (L29) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L28) located on top of the chassis.

FUSES

Two fuses are used. Both for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

BENDIX MODELS K2250, K2251, T2150, T2151 (Ch. T20, T20-1)

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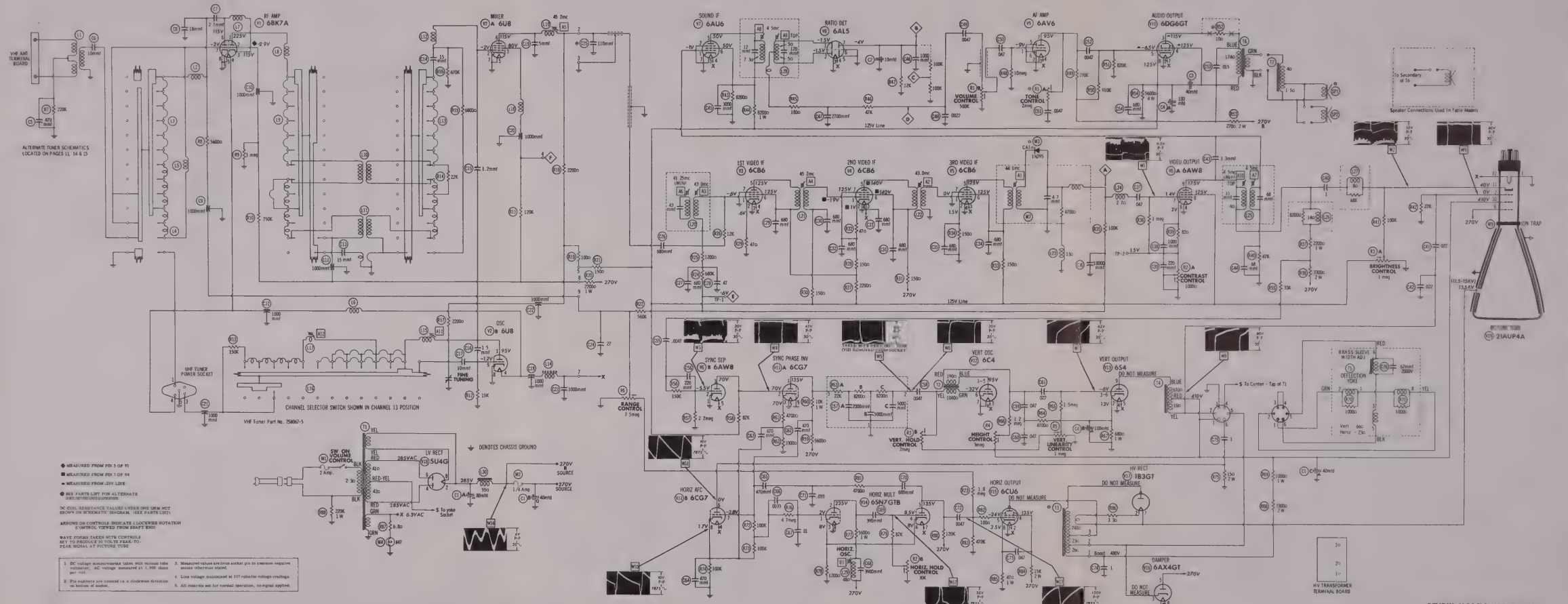


A PHOTOFACT STANDARD NOTATION SCHEMATIC
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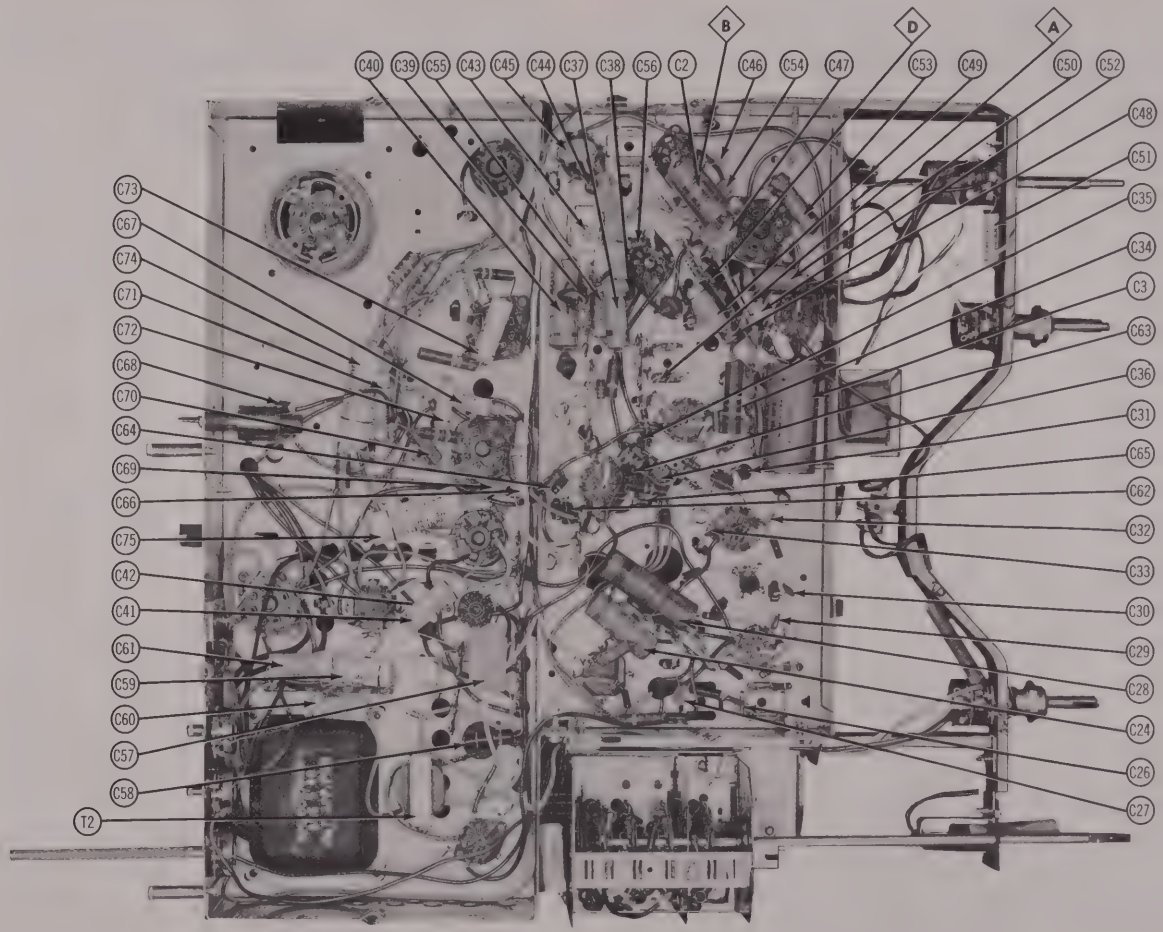
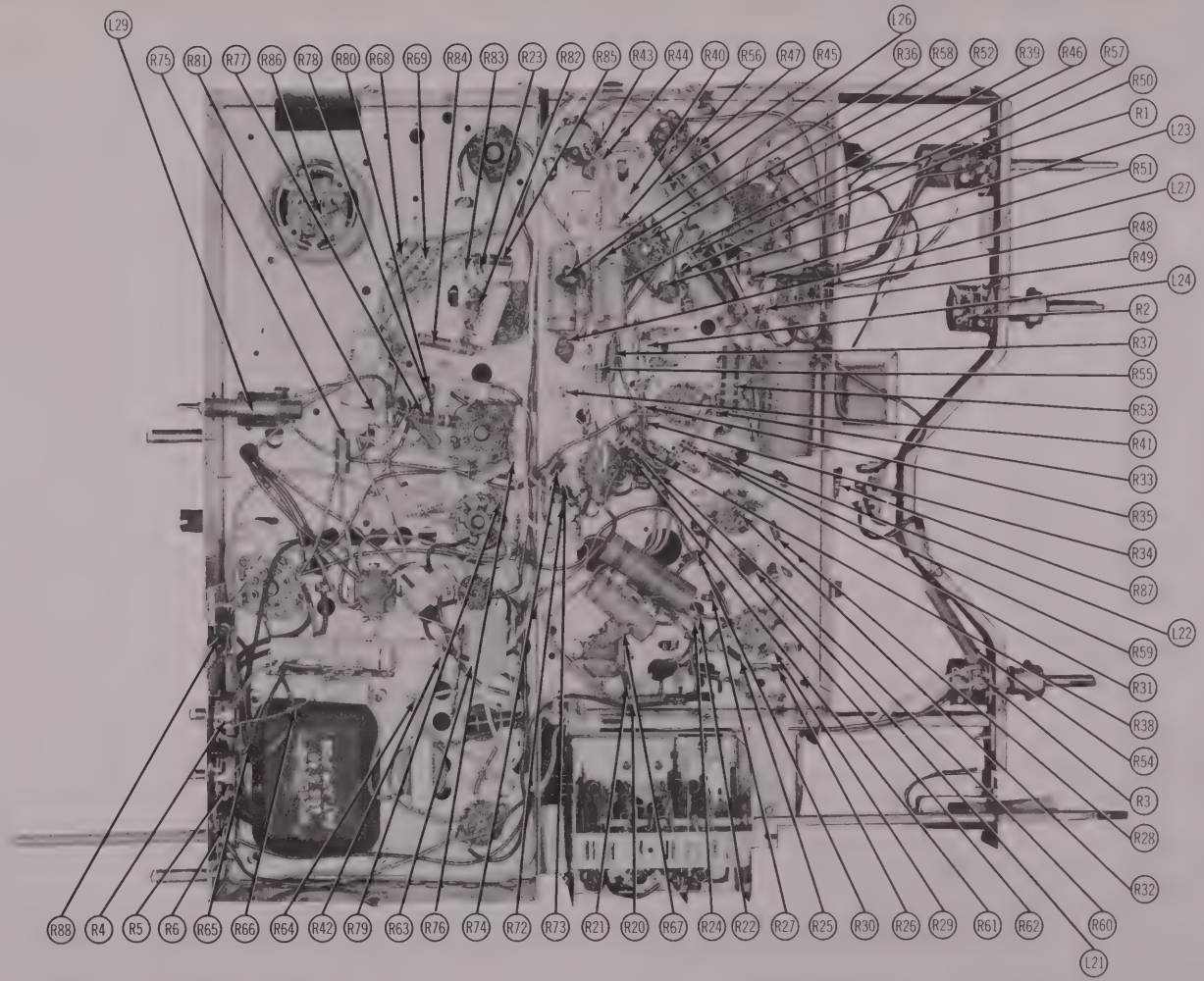
**BENDIX MODELS K2250, K2251, T2150, T2151 (Ch. T20, T20-1)**

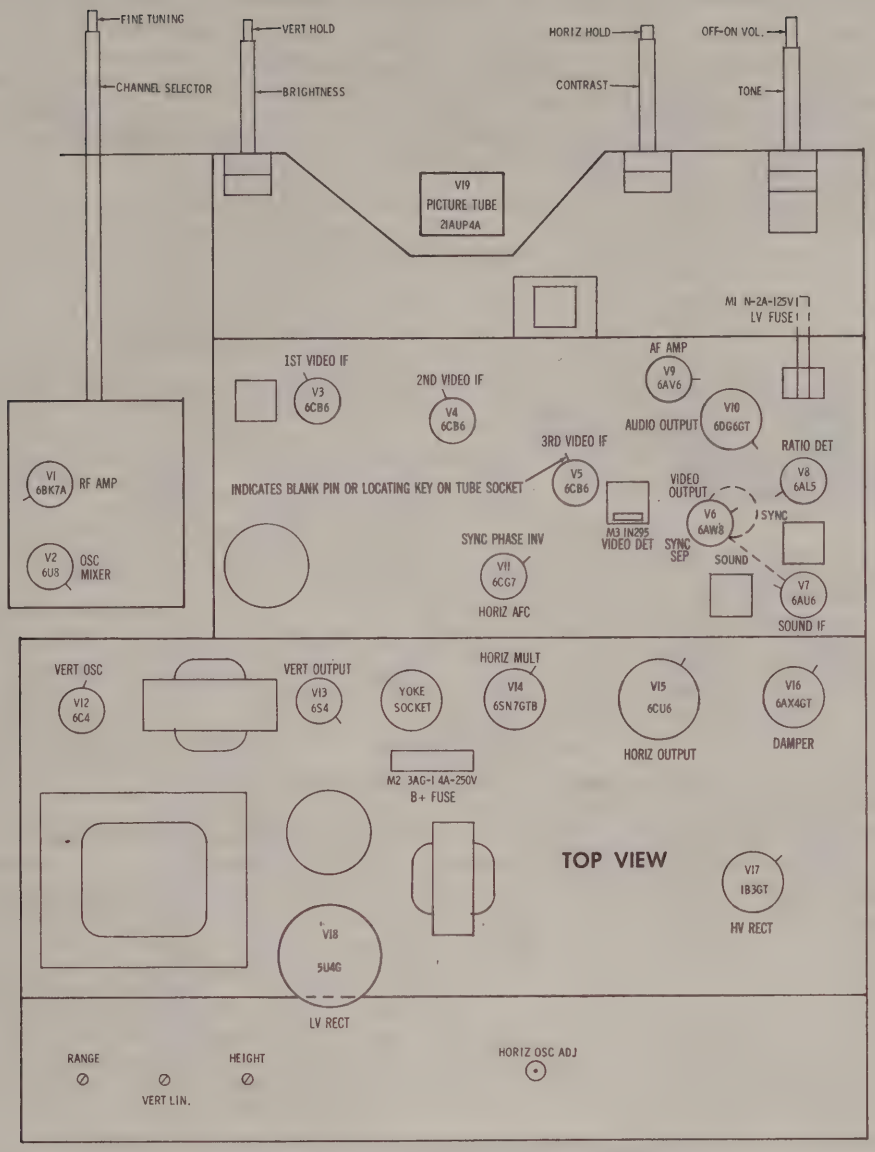



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

# TUBE PLACEMENT CHART




PROPERTY OF
L. F. BLANCHARD
[illegible] E. 1E ST.
DENVER, COLORADO



# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V18, Fuses (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V10
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V19
Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE
No vert. sync - V11, V12
No horiz. sync - V11, V14
No vert. or horiz. sync - V6, V11

SWEEP FAILURE
No raster, has sound - V14, V15, V16, V17, V19
No vertical deflection - V12, V13
Poor vert. linearity or foldover - V12, V13
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V15, V16, V17, V18
Vert. off freq. - V11, V12
Horiz. off freq. - V11, V14

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal multivibrator tube to disable the high voltage.

## VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to test point (E). Connect positive lead to chassis.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to ungrounded tube shield floating over converter tube (V2). Low side to chassis. | 44.1MC (Unmod.) | Any non-interfering channel | DC probe to point (A). Low side to chassis. | A1 | Adjust for maximum deflection. |
| 2. | " | " | 43.0MC | " | " | A2, A3 | " |
| 3. | " | " | 45.2MC | " | " | A4, A5 | " |
| 4. | " | " | 41.25MC | " | " | A6 | Increase signal generator output. Adjust A6 for MINIMUM deflection. |

## OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 5. | Direct | High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis. | 43MC (10MC Swp.) | 41.25MC 45.75MC | Any non-interfering channel | Vert. amp. thru 47K to point (A). Low side to chassis. | | Check for response similar to Fig. 1. If necessary, retouch A1 thru A5 for desired response. |

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±5%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.
Increase the bias as used under "Video IF Alignment" to -9 volts.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 6. | Direct | High side to point (A). Low side to chassis. | 4.5MC (Unmod.) | Any non-interfering channel | DC probe to point (B). Common to chassis. | A7, A8 | Adjust for maximum deflection. |
| 7. | " | " | " | " | DC probe to point (D). Common to point (C). | A9 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

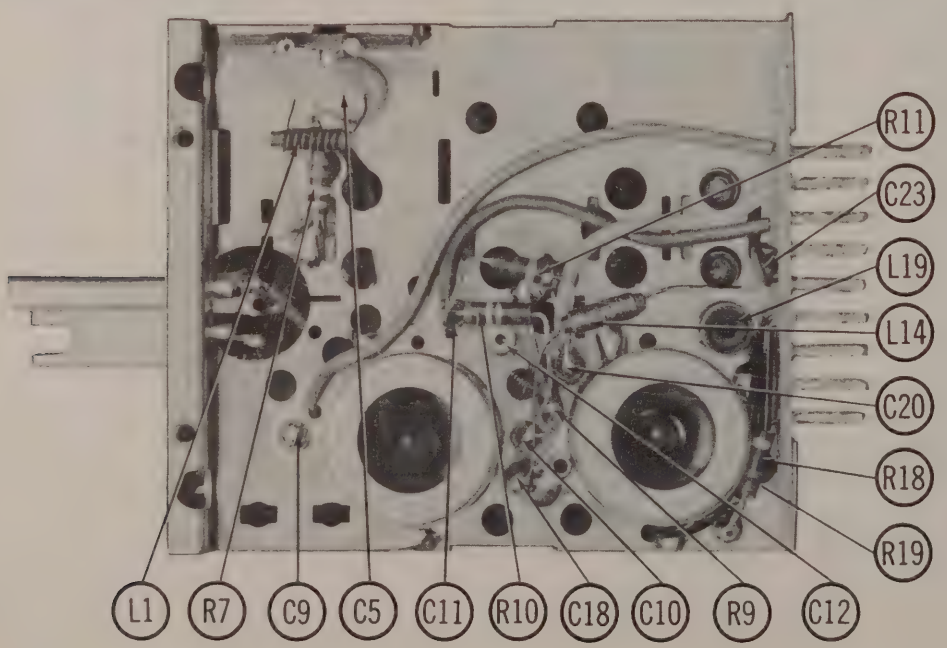
## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Increase the bias as used under "Video IF Alignment" to -9 volts.
Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | Direct | High side to point (A). Low side to chassis. | 4.5MC (450KC Swp.) | 4.5MC | Any non-interfering channel | Vert. amp. to point (B). Low side to chassis. | A7, A8 | Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2. |
| 7. | " | " | " | " | " | Vert. amp. to point (D). Low side to chassis. | A9 | Reconnect C2. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. Retouch A8 SLIGHTLY for maximum amplitude and straightness of crossover lines. |

## 4.5MC TRAP ALIGNMENT

Tune in a TV station and examine the picture for 4.5MC beat interference. If necessary, adjust A10 for MINIMUM interference.




RF TUNER TOP VIEW

# ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Connect 3 volt bias as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8. | Two 120Ω Carbon Resistors | Across antenna leads with 120Ω in each lead. | 213MC (10MC Swp.) | 211. 25MC 215. 75MC | 13 | Vert. amp. thru 47K to point (A). Low side to chassis. | A11 | Adjust to place sound marker in trap notch as in Fig. 4. Video should be at 50%. |
| 9. | " | " | 207MC (10MC Swp.) | 205. 25MC 209. 75MC | 12 | " | | Check high band channels for sound marker placement as in Fig. 4. If necessary, make SLIGHT compromise adjustment of A11 for best marker placement on all high band channels. |
| | | | 201MC (10MC Swp.) | 199. 25MC 203. 75MC | 11 | | | |
| | | | 195MC (10MC Swp.) | 193. 25MC 197. 75MC | 10 | | | |
| | | | 189MC (10MC Swp.) | 187. 25MC 191. 75MC | 9 | | | |
| | | | 183MC (10MC Swp.) | 181. 25MC 185. 75MC | 8 | | | |
| | | | 177MC (10MC Swp.) | 175. 25MC 179. 75MC | 7 | | | |
| 10. | " | " | 85MC (10MC Swp.) | 83. 25MC 87. 75MC | 6 | " | A12 | Adjust place sound marker in trap notch as in Fig. 4. Video Marker should be at 50%. |
| 11. | " | " | 79MC (10MC Swp.) | 77. 25MC 81. 75MC | 5 | " | | Check low band channels for sound marker placement as in Fig. 4. If necessary, make SLIGHT compromise adjustment of A12 for best marker placement on all low band channels. |
| | | | 69MC (10MC Swp.) | 67. 25MC 71. 75MC | 4 | | | |
| | | | 63MC (10MC Swp.) | 61. 25MC 65. 75MC | 3 | | | |
| | | | 57MC (10MC Swp.) | 55. 25MC 59. 75MC | 2 | | | |

RF AND MIXER ALIGNMENT FOR TUNERS #258061-3 AND 5

Connect 3 volt bias as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 12. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 213MC (10MC Swp.) | 211. 25MC 215. 75MC | 13 | Vert. amp. thru 10K to point (F). Low side to chassis. | A13, A14 | Adjust for maximum response similar to Fig. 5. |
| 13. | " | " | 207MC (10MC Swp.) | 205. 25MC 209. 75MC | 12 | " | | Check for response similar to Fig. 5. If markers fall below 70% on any channel, make compromise adjustment of A13 and A14 with channel switch set to that channel. Then recheck all other channels to make sure that they have not been seriously affected. |
| | | | 201MC (10MC Swp.) | 199. 25MC 203. 75MC | 11 | | | |
| | | | 195MC (10MC Swp.) | 193. 25MC 197. 75MC | 10 | | | |
| | | | 189MC (10MC Swp.) | 187. 25MC 191. 75MC | 9 | | | |
| | | | 183MC (10MC Swp.) | 181. 25MC 185. 75MC | 8 | | | |
| | | | 177MC (10MC Swp.) | 175. 25MC 179. 75MC | 7 | | | |
| | | | 85MC (10MC Swp.) | 83. 25MC 87. 75MC | 6 | | | |
| | | | 79MC (10MC Swp.) | 77. 25MC 81. 75MC | 5 | | | |
| | | | 69MC (10MC Swp.) | 67. 25MC 71. 75MC | 4 | | | |
| | | | 63MC (10MC Swp.) | 61. 25MC 65. 75MC | 3 | | | |
| | | | 57MC (10MC Swp.) | 55. 25MC 59. 75MC | 2 | | | |

RF AND MIXER ALIGNMENT FOR TUNER #258067-6

This portion of the receiver have been properly aligned at the factory and are very stable. Alignment of this portion should not be required in the field.

UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the set is not recommended in the field.

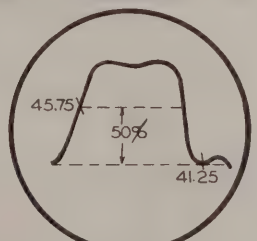


FIG. 1

FIG. 2

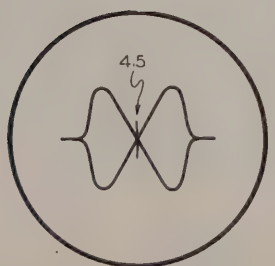


FIG. 3

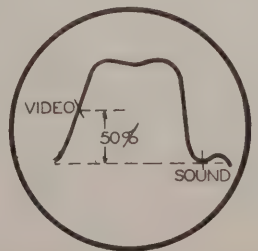


FIG. 4

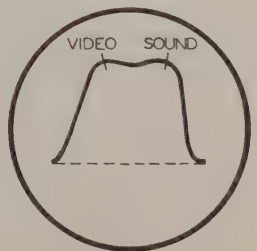
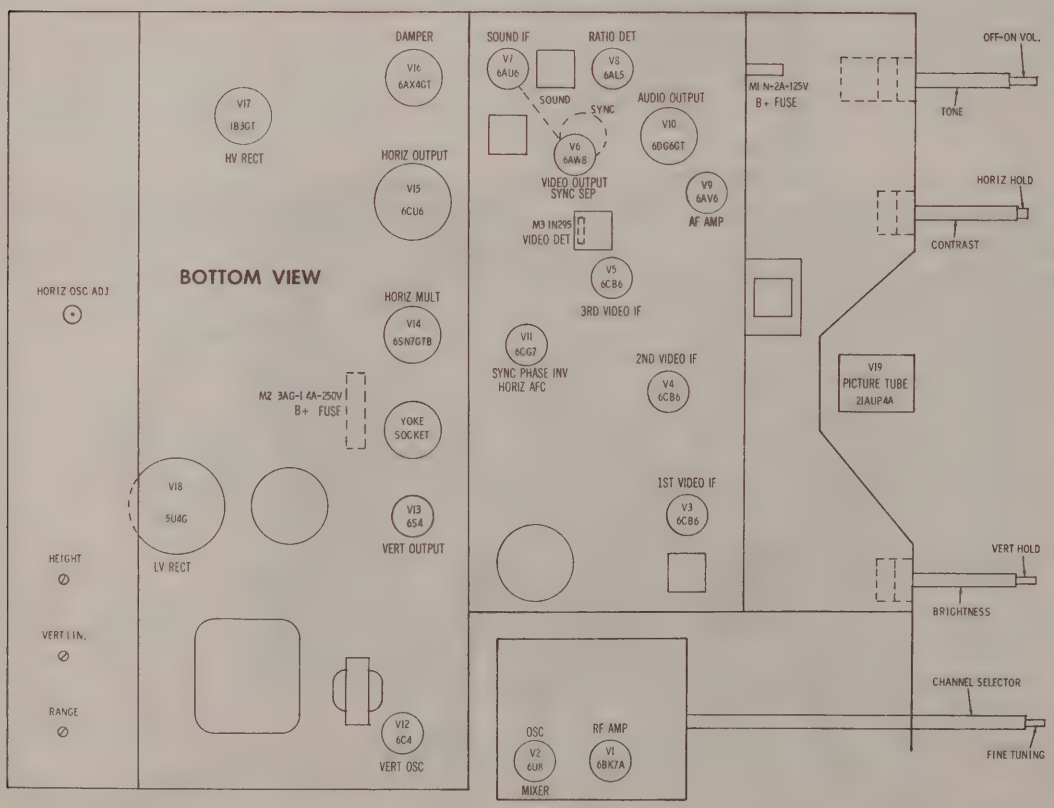


FIG. 5

# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6BK7A | †2.2K | 400K | INF. | .1Ω | 0Ω | INF. | 5.5K | 0Ω | 0Ω |
| V2 | 6U8 | ■2.5K | 470K | 120K | .1Ω | 0Ω | 2.5K | 0Ω | 0Ω | 15K |
| V3 | 6CB6 | 700K | 47Ω | 0Ω | .1Ω | ■2.2K | ■2.2K | 0Ω | | |
| V4 | 6CB6 | #150Ω | #47Ω | .1Ω | 0Ω | †200Ω | †200Ω | ■2.4K | | |
| V5 | 6CB6 | .1Ω | 150Ω | .1Ω | 0Ω | ■150Ω | ■150Ω | 0Ω | | |
| V6 | 6AW8 | 0Ω | 2.2meg | 82K | 0Ω | .1Ω | 150Ω | 1meg | 4K | †5.5K |
| V7 | 6AU6 | 47K | 0Ω | 0Ω | .1Ω | ■5K | ■5K | 0Ω | | |
| V8 | 6AL5 | INF. | INF. | 0Ω | .1Ω | 0Ω | 0Ω | 12K | | |
| V9 | 6AV6 | 10meg | 0Ω | 0Ω | .1Ω | 0Ω | 0Ω | †270K | | |
| V10 | 6DG6GT | TP | 0Ω | †500Ω | †325Ω | 400K | NC | .1Ω | 4K | |
| V11 | 6CG7 | †15K | ■42K | 8K | .1Ω | 0Ω | 15Ω | 300K | 100K | 0Ω |
| V12 | 6C4 | ▲2.5meg | NC | .1Ω | 0Ω | ▲2.5meg | 2meg | 0Ω | | |
| V13 | 6S4 | NC | 680Ω | 2meg | 0Ω | .1Ω | 2meg | NC | NC | ▲5K |
| V14 | 6SN7GTB | 5meg | †5.6K | 1.2K | 90K | †120K | 1.2K | .1Ω | 0Ω | |
| V15 | 6CU6 | NC | .1Ω | NC | †15K | 400K | TP | 0Ω | 47Ω | ▲23Ω |
| V16 | 6AX4GT | NC | NC | 300K | NC | †55Ω | NC | 0Ω | .1Ω | |
| V17 | 1B3GT | PINS | 1-8 | HAVE | INF. | RESISTANCE | | | | TOP CAP 763Ω |
| V18 | 5U4G | NC | 100K | TP | 42Ω | NC | 41Ω | NC | 100K | |
| V19 | 21AUP4A | 0Ω | 22K | PIN 6 †55Ω | PIN 10 ▲4.3K | PIN 11 ■200K | PIN 12 .1Ω | | | |

† MEASURED FROM PIN 2 OF V18.
■ MEASURED FROM 125V LINE.
▲ MEASURED FROM PIN 3 OF V16.
TP TIE POINT.
NC NO CONNECTION.

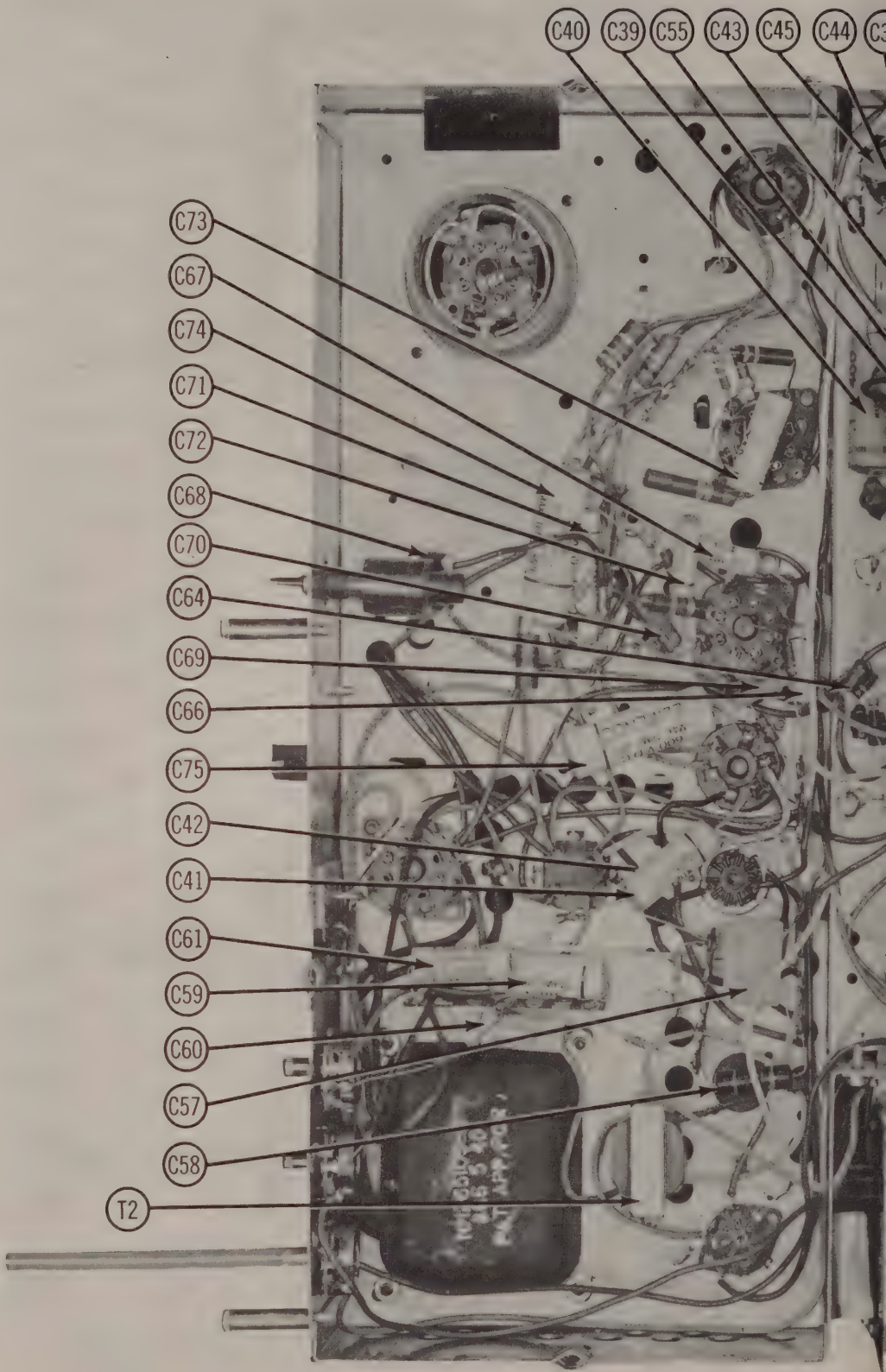



# TUBE PLACEMENT CHART

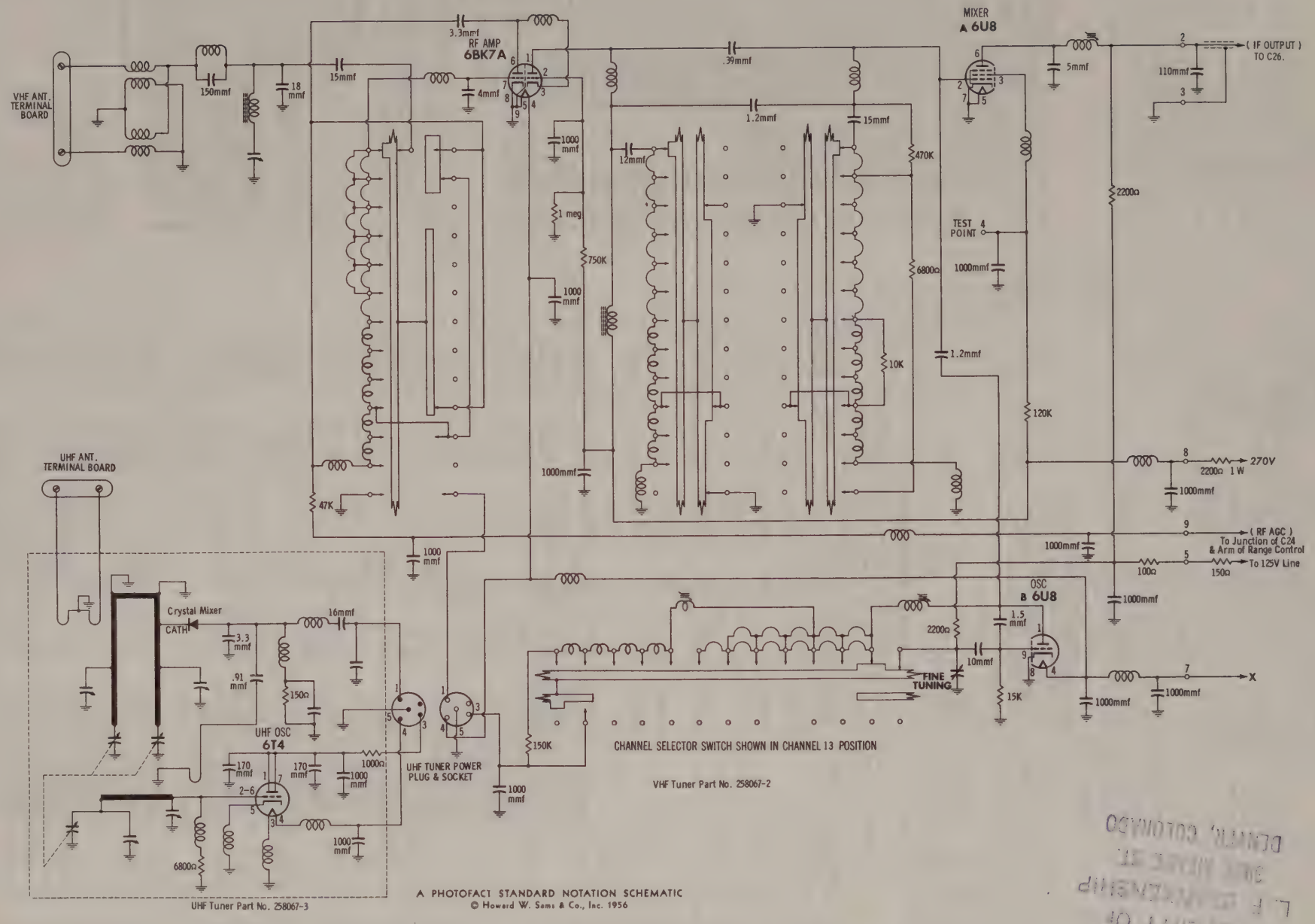
PROPERTY OF
L. F. BI NKENSHIP
39[illegible] MEADE ST.
DEN[illegible], COLORADO




R AND INDUCTOR IDENTIFICATION




CHASSIS BOTTOM VIEW-CAPACITOR




# ALTERNATE VHF-UHF TUNER SCHEMATIC

## BENDIX MODELS K2250, K2251, T2150, T2151 (Ch. 120, 120-1)

PROPERTY OF
L. F. ENGELSMAN
3000 ARAPAHOE ST.
DENVER, COLORADO

# TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amplifier | 6BK7A | |
| V2 | Mixer-Oscillator | 6U8 | |
| V3 | 1st. Video IF Amplifier | 6CB6 | |
| V4 | 2nd. Video IF Amplifier | 6CB6 | |
| V5 | 3rd. Video IF Amplifier | 6CB6 | |
| V6 | Video Output-Sync Sep. | 6AW8 | |
| V7 | Sound IF Amplifier | 6AU6 | |
| V8 | Ratio Detector | 6AL5 | |
| V9 | AF Amplifier | 6AV6 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V10 | Audio Output | 6DG6GT | |
| V11 | Sync Phase Inv.-Horiz. AFC | 6CG7 | |
| V12 | Vert. Oscillator | 6C4 | |
| V13 | Vert. Output | 6S4 | |
| V14 | Horiz. Mult. | 6SN7GTB | |
| V15 | Horiz. Output | 6CU6 | |
| V16 | Damper | 6AX4GT | |
| V17 | HV Rectifier | 1B3GT | |
| V18 | LV Rectifier | 5U4G | |

# PICTURE TUBE

| ITEM No. | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|
| | BENDIX PART No. | CBS PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V19 | 21AUP4A ① | 21AUP4A① | 21AUP4A ①<br>21AUP4A/B ① | 21AUP4A<br>21AUP4A/B ② | ① Aluminized<br>② Silver screen "85" |
| | | 21AUP4 | | | |

# ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | BENDIX PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | ▬80 | 350 | 267005-15 | AFH3-154-3C | C035 | FP375.5 | TMQ-120 | Q-065 | R2226 * |
| B | ■40 | 350 | | | BR4035 | | | | |
| C | ▲40 | 450 | | | | | | | |
| C2 | 10 | 50 | 267024-26 | PRS50V10 | BR105 | TC32 | TD-10-50 | FM-0510 | TVA-1304 |
| C3 | 40 | 300 | 267024-28 | PRS350V40 | BR4035 | TC78 | TD-40-350 | FM-4540 | TVA-1611 |
| C4A | ▬100 | 200 | 267016-5 | AFH52-110 | C157 | FP150 | TMD-69 | D-322 | R2026 * |
| B | ▲100 | 50 | | | | TC3501 | | | |

* Non-catalog item.

# FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | BENDIX PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C5 | 470 | | | DI00047 | DD-471 | K060 | 811-471 | UC-5347 | 5GA-T47 | |
| C6 | 10 | | | NP0-SI10 | TCZ-10 | TZ09 | NP0A-100 | ZT-541 | 5TCC-Q1 | |
| C7 | 2.7 | | | | | | | | | |
| C8 | 18 | | | DI000018 | D6-180 | G022 | 831-180 | UC-5418 | 5GA-Q18 | |
| C9 | 1000 | | | | | | | | | |
| C10 | 1000 | | | | | | | | | |
| C11 | 1000 | | | | | | | | | |
| C12 | 1000 | | | | | | | | | |
| C13 | 15 | | | NP0-SI15 | TCZ-15 | Z021 | NP0K-150 | | 5TCC-Q15 | |
| C14 | 15 | | | DI000015 | DD-150 | G021 | 831-150 | UC-5415 | 5GA-Q15 | |
| C15 | 1.2 | | | | | | | | | |
| C16 | 1.5 | | | | | TZ04 | | | | |
| C17 | 10 | | | DI00001 | DD-100 | G018 | 831-100 | ZT-541 | 5GA-Q1 | |
| C18 | 1000 | | | | | | | | | |
| C19 | 5 | | | DI000005 | DD-050 | G011 | 831-050 | ZT-555 | 5GA-V5 | |
| C20 | 1000 | | | | | | | | | |
| C21 | 1000 | | | | | | | | | |
| C22 | 1000 | | | | | | | | | |
| C23 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C24 | .22 | 100 | 267071-224 | P288N-22 | | CUB2S22 | | PT4022 | 2TM-P22 | |
| C25 | 110 | | 267519-111 | 1469-00011 | TCZ-110 | TZ31 | NP0-333-111 | | | Note 1 |
| C26 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C27 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C28 | .47 | 100 | 267071-474 | P288N-47 | | CUB2P47 | | PT4047 | 2TM-P47 | |
| C29 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C30 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C31 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C32 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C33 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C34 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C35 | 680 | | CC261Y5Y681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C36 | 10000 | | CC263Z5Z103P | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C37 | .047 | 200 | 267068-473 | BPD-05 | DF-503 | CUB2S47 | | PT4047 | 2TM-S47 | |
| C38 | 1000 | | 267072-102 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C39 | 220 | | 267072-221 | DI00022 | DD-221 | G051 | 811-221 | UC-5322 | 5GA-T22 | |
| C40 | .1 | 400 | 267069-104 | P488N-1 | DF-104 | CUB4P1 | | PT401 | 4TM-P1 | |
| C41 | .022 | 600 | 267055-223 | BPD-02 | DF-203 | CUB6S22 | 817-02 | PT6122 | 6TM-S22 | |
| C42 | .022 | 600 | 267055-223 | BPD-02 | DF-203 | CUB6S22 | 817-02 | PT6122 | 6TM-S22 | |
| C43 | 3.3 | | 267044-033 | NP0-SI3.3 | TCZ-3R3 | TZ06 | NP0A-3R3 | ZT-5533 | 5TCCB-V33 | |
| C44 | 68 | | 267518-680 | NP0-DI68 | TCZ-68 | TZ26 | 801-680 | | 5TCC-Q68 | |
| C45 | 3000 | | 267086-302 | DI003 | DD-302 | K076 | 811-003 | UC-523 | 5GA-D3 | |
| C46 | 1000 | | CC261Z5Z102P | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C47 | 2700 | | 267072-272 | DI0027 | DD-272 | K075 | 811-0027 | UC-5227 | 5GA-D27 | |
| C48 | .0022 | 400 | 267069-222 | BPD-0022 | D6-222 | CUB6D22 | GP2-333-222 | PT6222 | 6TM-D22 | |
| C49 | .0047 | 400 | 267036-472 | BPD-0047 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C50 | .047 | 200 | 267068-473 | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C51 | .0047 | 400 | 267036-472 | BPD-0047 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C52 | .0047 | 400 | 267036-472 | BPD-0047 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C53 | .015 | 400 | 267069-153 | BPD-015 | DD16-153 | CUB6S15 | 821-015 | PT6115 | 4TM-S15 | |
| C54 | 680 | | CC261Y5Y681M | DI00068 | DD-680 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C55 | .0047 | 600 | 267055-472 | BPD-0047 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C56 | 220 | | CC222Y5Y221M | SI220 | D6-221 | TZ38 | GP2K-221 | UC-5322 | 5GA-T22 | |
| C57A | 2000 | | | | | | | DC-522 | | |
| B | 5000 | | †274310-1 | †PA110 | †PC-100 | †115TM1 | †1405-01 | DC-525 | †V-1 | |
| C | 5000 | | | | | | | DC-525 | | |
| C58 | .0047 | 400 | 267036-472 | BPD-0047 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C59 | .047 | 600 | 267060-473 | BPD-05 | DF-503 | CUB6S47 | | PT6147 | 6TM-S47 | |
| C60 | .047 | 400 | 267036-473 | BPD-05 | DF-503 | CUB6S47 | | PT4147 | 4TM-S47 | |
| C61 | .022 | 600 | 267060-223 | BPD-02 | DF-203 | CUB6S22 | 817-02 | PT6122 | 6TM-S22 | |
| C62 | 470 | | CC222Y5Y471M | SI470 | D6-471 | TP46 | GP2K-471 | UC-5347 | 5GA-T47 | |
| C63 | 470 | | CC222Y5Y471M | SI470 | D6-471 | TP46 | GP2K-471 | UC-5347 | 5GA-T47 | |
| C64 | 470 | | CC222Y5Y471M | SI470 | D6-471 | TP46 | GP2K-471 | UC-5347 | 5GA-T47 | |
| C65 | 470 | | CC222Y5Y471M | SI470 | D6-471 | TP46 | GP2K-471 | UC-5347 | 5GA-T47 | |
| C66 | .0033 | 400 | 267036-332 | BPD-0033 | D6-332 | CUB6D33 | GP2-333-332 | PT6233 | 6TM-D33 | |
| C67 | .01 | 200 | 267056-103 | BPD-01 | D6-103 | CUB4S1 | GP2-333-103 | PT411 | 4TM-S1 | |
| C68 | 3900 | | CM24J392K | 1464-0039 | | 1R5D39 | | | MS-239 | |
| C69 | 390 | 500 | CM22B391K | | D6-391 | 5R5T39 | 811-391 | | MS-339 | |
| C70 | 680 | 500 | CM24B681K | 1464-00068 | D6-681 | 1R5T68 | 811-681 | | MS-368 | |
| C71 | .033 | 200 | 267056-333 | BPD-03 | DF-303 | CUB6S33 | | PT4133 | 6TM-S33 | |
| C72 | .0047 | 400 | 267036-472 | BPD-0047 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C73 | .047 | 400 | 267036-473 | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C74 | .1 | 600 | 267055-104 | P688N-1 | DF-104 | CUB6P1 | | PT601 | 6TM-P1 | |
| C75 | .1 | 600 | 267055-104 | P688N-1 | DF-104 | CUB6P1 | | PT601 | 6TM-P1 | |
| C76 | 62 | 2000 | 275165-1 | | | | | | 20GA-Q62 | |

† Items C57A, C57B, C57C, R63A, R63B and R63C are combined in one unit.
Note 1. Some versions use a 22MMF unit in this application.

# PARTS LIST AN
CONT

| ITEM No. | RATING | | REPLACEMENT | | |
|---|---|---|---|---|---|
| | RESISTANCE | WATTS | BENDIX PART No. | CENTRALAB PART No. | CLAROST PART N |
| R1A | 2Meg | ½ | LH262055-1 | | RTV-49 |
| B | 500KΩ | ½ | | | |
| R2A | 1000Ω | ½ | LH262045-8 | F1-5 | |
| B | 30KΩ | ½ | | R2-28 | |
| R3A | 1Meg | ½ | 262045-9 | F1-51 | |
| B | 2Meg | ½ | | R2-67 | |
| R4A | 3Meg | ½ | OCH262025-27 | AB-84 | A47-3M |
| B | Shaft | | Not Req. | AK-1 | FKS-½ |
| R5A | 1Meg | ½ | OCH262025-28 | AB-89 | A47-1M |
| B | Shaft | | Not Req. | AK-1 | FKS-½ |
| R6A | 7.5Meg | ½ | OCH262025-31 | AB-89 | A47-7.5Me |
| B | Shaft | | Not Req. | AK-4 | FKS-½ |

Note 1. Some versions will use an alternate control Part No.
* Concentrikit Equivalent, K-6 Kit, Base Elements and Shafts;

# RESIST

All wattages 1/2 watt, or less

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | BENDIX PART No. | IRC PART No. | |
| R7 | 220K | | | | |
| R8 | 5600Ω | | | BTS-5600 | |
| R9 | 1Meg | | | BTS-1Meg | |
| R10 | 750K | | | BTS-750K 5% | |
| R11 | 120K | | | BTS-120K | |
| R12 | 15KΩ | | | BTS-15K | |
| R13 | 150K | | | BTS-150K | |
| R14 | 22K | | | BTS-22K | |
| R15 | 6800Ω | | | BTS-6800 | |
| R16 | 470K | | | BTS-470K | |
| R17 | 2200Ω | | | BTS-2200 | |
| R18 | 2200Ω | | | BTS-2200 | |
| R19 | 100Ω | | | BTS-100 | |
| R20 | 2200Ω | 1 | RC24A222K | BTA-2200 | |
| R21 | 150Ω | | RC23A151K | BTS-150 | |
| R22 | 560K | | RC23A564K | BTS-560K | |
| R23 | 1.8Meg | | RC23A185K | BTS-1.8Meg | |
| R24 | 680K | | RC23A684K | BTS-680K | |
| R25 | 1200Ω | | RC23A122K | BTS-1200 | |
| R26 | 12KΩ 5% | | RC23A123J | | |
| R27 | 2200Ω | | RC23A222K | BTS-2200 | |
| R28 | 150Ω | | RC23A151K | BTS-150 | |
| R29 | 47Ω | | RC23A470K | BTS-47 | |
| R30 | 150Ω | | RC23A151K | BTS-150 | |
| R31 | 150Ω | | RC23A151K | BTS-150 | |
| R32 | 47Ω | | RC23A470K | BTS-47 | |
| R33 | 150Ω | | RC23A151K | BTS-150 | |
| R34 | 150Ω | | RC23A151K | BTS-150 | |
| R35 | 100K | | RC23A104K | BTS-100K | |
| R36 | 1Meg | | RC23A105K | BTS-1Meg | |
| R37 | 2200Ω | 1 | RC24A222K | BTA-2200 | |
| R38 | 3300Ω | 2 | RC25A332K | BTB-3300 | |
| R39 | 82Ω | | RC23A820K | BTS-82 | |
| R40 | 47K | | RC23A473K | BTS-47K | |
| R41 | 100K | | RC23A104K | BTS-100K | |
| R42 | 22K | | RC23A223K | BTS-22K | |
| R43 | 8200Ω | | RC23A822K | BTS-8200 | |
| R44 | 8200Ω | 1 | RC24A822K | BTA-8200 | |
| R45 | 180Ω | | RC23A181K | BTS-180 | |
| R46 | 47KΩ | | RC23A473K | BTS-47K | |
| R47 | 12KΩ | | RC23A123K | BTS-12K | |
| R48 | 10Meg | | RC23A106K | BTS-10Meg | |

Note 1. Not used in some versions.
† Items R63A, R63B, R63C, C57A, C

# TRANSFORM

| ITEM No. | RATING | | | | BENDIX PART No. |
|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | |
| T1 | 117VAC | 560VCT | 5V | 6.3V | 265109-3 |
| | ⑨ 1.46A | ⑨ .170A | ⑨ 3A | ⑨ 9.5A | |

# TRANSFORMERS

| ITEM No. | USE | BENDIX PART No. | Halldorson PART No. | Mer PART |
|---|---|---|---|---|
| T2 | Vert. Osc. Trans. | 265094-2 | B6702 | A-300 |
| T3 | Horiz. Output Trans. | 265112-1<br>265111-1 ② | FB460 * ①<br>HVO-3 | HVO-3 |
| T4 | Vert. Output Trans. | 265110-1 | Z1804 | A-303 |
| T5A | Yoke-Horiz.(18.5MH) | 265096-5 ③ | DF605 ④ | MDF- |
| B | Vert. (51MH) | | ⑤ ⑥ | ⑥ |

① Drill new mounting hole(s).
② Alternate Bendix part number.
③ Includes plug, rear cover and centering device, capacitor
④ Use original rear cover and centering device.
⑤ Connect horizontal damping network across terminals #3 a
⑥ Connect horizontal yoke terminal #3 to yoke plug pin #5, b
⑦ Remove capacitor from terminals #1 and #2. Use original

## *HORIZONTAL OUTPUT TRA

Use Original Width Coil U

| | ORIGINAL TERMINAL CONNECTIONS | Halldorson Replacement Connections | Merit Replacement Connections | RC Replac Conne |
|---|---|---|---|---|
| | 3 | 5 | 5 | 9 |
| | 2 | 4 | 4 | 5 |
| | 1 | 3 | 3 | 1 |
| Special Notes → | | | | |

⑧ Jumper terminals #8 and #7.

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amplifier | 6BK7A | |
| V2 | Mixer-Oscillator | 6U8 | |
| V3 | 1st. Video IF Amplifier | 6CB6 | |
| V4 | 2nd. Video IF Amplifier | 6CB6 | |
| V5 | 3rd. Video IF Amplifier | 6CB6 | |
| V6 | Video Output-Sync Sep. | 6AW8 | |
| V7 | Sound IF Amplifier | 6AU6 | |
| V8 | Ratio Detector | 6AL5 | |
| V9 | AF Amplifier | 6AV6 | |
| V10 | Audio Output | 6GG6GT | |
| V11 | Sync Phase Inv.-Horiz. AFC | 6CG7 | |
| V12 | Vert. Oscillator | 6C4 | |
| V13 | Vert. Output | 6S4 | |
| V14 | Horiz. Mult. | 6BN7GTB | |
| V15 | Horiz. Output | 6CU6 | |
| V16 | Damper | 6AX4GT | |
| V17 | HV Rectifier | 1B3GT | |
| V18 | LV Rectifier | 5U4G | |

## PICTURE TUBE

| ITEM No. | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|
| | BENDIX PART No. | CBS PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V19 | 21AUP4A ① | 21AUP4A② | 21AUP4A ① | 21AUP4A ③<br>21AUP4A/B ①<br>④ | ① Aluminized<br>② Silver screen "SS" |
| | | 21AUP4 | | | |

## ELECTROLYTIC CAPACITORS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CAP | VOLT | BENDIX PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | +80 | 350 | 387006-18 | AFH3-354-3C | C035 | FP675.5 | TMQ-120 | Q-065 | R2226 * |
| B | +40 | 350 | | | BR4035 | | | | |
| C | +40 | 450 | | | | | | | |
| C2 | 40 | 50 | 387024-36 | PR850V10 | BR105 | TC33 | TD-10-50 | FM-0510 | TVA-1304 |
| C3 | 40 | 300 | 387034-38 | PR850V40 | BR4025 | TC78 | TD-40-350 | FM-4540 | TVA-1851 |
| C4A | +100 | 200 | 387018-5 | AFH3S-11D | C187 | FP390 | TMD-89 | D-323 | R2026 * |
| B | +100 | 50 | | | | TC3501 | | | |

* Non-catalog item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | BENDIX PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | | |
| C5 | 470 | | | DH00047 | DD-471 | K060 | 811-471 | UC-5347 | 5GA-T47 | | |
| C6 | 10 | | | NPO-4U10 | DY-10 | T250 | NP0A-100 | ST-541 | 5TCC-Q5 | | |
| C7 | 2.7 | | | | | | | | | | |
| C8 | 18 | | | DI000018 | DD-180 | G022 | 831-180 | UC-5418 | 5GA-Q18 | | |
| C9 | 1000 | | | | | | | | | | |
| C10 | 1000 | | | DI001000 | DD-102 | K060 | 811-102 | UC-5368 | 5GA-T68 | | |
| C11 | 1000 | | | | | | | | | | |
| C12 | 1000 | | | | | | | | | | |
| C13 | 15 | | | NPO-4U15 | TC2-15 | G021 | NP0K-150 | | 5TCC-Q15 | | |
| C14 | 15 | | | DI000015 | DD-150 | G021 | 831-150 | UC-5415 | 5GA-Q15 | | |
| C15 | 1.2 | | | | | | | | | | |
| C16 | 10 | | | | | TZ04 | | | | | |
| C17 | 10 | | | DI00001 | DD-106 | G018 | 831-100 | ST-541 | 5GA-Q | | |
| C18 | 1000 | | | | | | | | | | |
| C19 | 5 | | | DI000005 | DD-050 | G011 | 831-050 | ST-555 | 5GA-V5 | | |
| C20 | 1000 | | | | | | | | | | |
| C21 | 1000 | | | | | | | | | | |
| C22 | 1000 | | | | | | | | | | |
| C23 | 1000 | | | BPD-001 | DD-102 | K060 | 801-001 | DC-531 | 5HK-D1 | | |
| C24 | .02 | 100 | 387071-524 | P268N-23 | CU3S822 | | P17D823 | 37M-P23 | 37M-P23 | | Note 1 |
| C25 | 110 | | 387518-111 | 1659-00011 | TC2-110 | T231 | NP0-333-111 | | | | |
| C26 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C27 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C28 | .47 | 100 | 387071-474 | P268N-47 | | CU3EP47 | | TP6047 | 37M-P47 | | |
| C29 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C30 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C31 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C32 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C33 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C34 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C35 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C36 | 10000 | | CC283Z512G3P | BPD-01 | DD-103 | K093 | 811-01 | DC-531 | 5HK-S1 | | |
| C37 | .047 | 300 | 387068-473 | BPD-05 | DF-503 | CU3S847 | | PT6047 | 37M-S47 | | |
| C38 | 1000 | | 387073-102 | BPD-001 | DD-102 | K060 | 801-001 | DC-531 | 5HK-D1 | | |
| C39 | 330 | | 387073-331 | BPD0033 | DD-331 | K075 | 811-331 | UC-5333 | 5GA-T32 | | |
| C40 | .1 | 400 | 387069-104 | P488N-1 | DF-104 | CU3491 | | PT401 | 47M-P1 | | |
| C41 | .022 | 600 | 387055-223 | BPD-02 | DF-203 | CU3S823 | 817-02 | PT6123 | 37M-S22 | | |
| C42 | .033 | 600 | 387055-333 | BPD-03 | DF-303 | CU3S822 | 817-03 | PT6122 | 37M-S22 | | |
| C43 | 3.3 | | 387044-033 | NPO-S13.3 | TC2-3R3 | T206 | NP0A-3R3 | ZT-5533 | 5TCCB-V33 | | |
| C44 | .05 | | 387518-480 | 1659-00048 | TC2-68 | T215 | 861-480 | | 5TCC-Q68 | | |
| C45 | 3000 | | 387065-302 | DI003 | DD-302 | K076 | 811-003 | UC-533 | 5GA-D3 | | |
| C46 | 1000 | | CC281Z512G1P | BPD-001 | DD-102 | K060 | 801-001 | DC-531 | 5HK-D1 | | |
| C47 | 2700 | | 387072-272 | DI0027 | DD-272 | K075 | 811-0027 | UC-5327 | 5GA-D27 | | |
| C48 | .0022 | 400 | 387069-222 | BPD-0022 | DS-223 | CU3SD223 | GP2-333-223 | PT6232 | 57M-D22 | | |
| C49 | .0047 | 400 | 387069-473 | BPD-0047 | DS-473 | CU3SD473 | GP2-333-473 | PT6247 | 57M-D47 | | |
| C50 | .047 | 300 | 387068-473 | BPD-05 | DF-503 | CU3S847 | | PT6047 | 37M-S47 | | |
| C51 | .0047 | 400 | 387036-472 | BPD-0047 | DS-473 | CU3SD47 | GP2-333-472 | PT6247 | 57M-D47 | | |
| C52 | .0047 | 400 | 387036-473 | BPD-0047 | DS-473 | CU3SD473 | GP2-333-473 | PT6247 | 57M-D47 | | |
| C53 | .015 | 600 | 387069-153 | BPD-015 | DD15-153 | CU3S815 | 831-015 | PT6115 | 47M-S15 | | |
| C54 | 680 | | CC281Y5T681M | DI00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | | |
| C55 | .0047 | 600 | 387055-472 | BPD-0047 | DS-472 | CU3SD47 | GP2-333-472 | PT6247 | 57M-D47 | | |
| C56 | 220 | | CC281TY221M | EQ220 | D-331 | T238 | GP2K-221 | UC-5321 | 5GA-T22 | | |
| C57A | 3000 | | | | | | | DC-532 | | | |
| B | 5000 | | †374330-1 | †PA1U3 | †PC-100 | †1157M1 | †1409-01 | DC-525 | †V-1 | | |
| C | 5000 | | | | | | | DC-532 | | | |
| C58 | .0047 | 400 | 387036-472 | BPD-0047 | DS-472 | CU3SD47 | GP2-333-472 | PT6247 | 57M-D47 | | |
| C59 | .047 | 600 | 387060-473 | BPD-05 | DF-503 | CU3S847 | | PT6147 | 37M-S47 | | |
| C60 | .047 | 400 | 387036-473 | BPD-047 | DF-503 | CU3S847 | | PT6147 | 37M-S47 | | |
| C61 | .022 | 600 | 387060-223 | BPD-02 | DF-203 | CU3S823 | 817-02 | PT6123 | 37M-S22 | | |
| C62 | 470 | | CC222Y5T471M | S1470 | D6-471 | T246 | GP2K-471 | UC-5347 | 5GA-T47 | | |
| C63 | 470 | | CC222Y5T471M | S1470 | D6-471 | T246 | GP2K-471 | UC-5347 | 5GA-T47 | | |
| C64 | 470 | | CC222Y5T471M | S1470 | D6-471 | T246 | GP2K-471 | UC-5347 | 5GA-T47 | | |
| C65 | 470 | | CC222Y5T471M | S1470 | D6-471 | T246 | GP2K-471 | UC-5347 | 5GA-T47 | | |
| C66 | .0033 | 400 | 387036-332 | BPD-0033 | D6-332 | CU3SD33 | GP2-333-332 | PT6233 | 57M-D33 | | |
| C67 | .01 | 300 | 387056-103 | BPD-01 | D6-103 | CU3491 | GP2-333-103 | PT611 | 47M-S1 | | |
| C68 | 3900 | | CM32A392K | 1464-00039 | | SR3D39 | | | MS-239 | | |
| C69 | 390 | 500 | CM32B391K | | D6-391 | SR5T39 | 811-391 | | MS-339 | | |
| C70 | 680 | 500 | CM32B681K | 1464-00068 | D6-681 | SR5T68 | 811-681 | | MS-368 | | |
| C71 | .033 | 300 | 387056-333 | BPD-03 | DF-303 | CU3S833 | | PT6133 | 37M-S33 | | |
| C72 | .0047 | 400 | 387036-472 | BPD-0047 | DS-472 | CU3SD47 | GP2-333-472 | PT6247 | 57M-D47 | | |
| C73 | .047 | 400 | 387036-473 | BPD-05 | DF-503 | CU3S847 | | PT6147 | 37M-S47 | | |
| C74 | .1 | 600 | 387055-104 | P668N-1 | DF-104 | CU3491 | | PT601 | 47M-P1 | | |
| C75 | .1 | 600 | 387055-104 | P668N-1 | DF-104 | CU3491 | | PT601 | 47M-P1 | | |
| C76 | 62 | 2000 | 375185-1 | | | | | | 32GA-Q62 | | |

† Items C57A, C57B, C57C, R53A, R53B and R53C are combined in one unit.
Note 1. Some versions use a 33MMF unit in this application.

## CONTROLS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | BENDIX PART No | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No | MALLORY PART No | |
| R1A | 1Meg | | LB26055-1 | | R17V-689 | * QJ-908 | UE17478 | Tone (Panel)-Note 1 |
| B | 500KΩ | | | | | | | Volume & Switch (Rear) |
| R2A | 1000Ω | | LB26045-8 | F1-5 | | | UE61 | Contrast (Panel) |
| B | 500Ω | | | B2-33 | | | | Horiz. Hold (Rear) |
| R3A | 1Meg | | 262045-9 | F1-51 | | | UF15L | Brightness (Panel) |
| B | 2Meg | | | B2-67 | | | UB26L | Vert. Hold (Rear) |
| R4A | 5Meg | | OCH262025-27 | AB-54 | A47-2Meg-6 | QU-140 | TA36L | Height |
| B | Shaft | | Not Req. | AK-1 | FS3-1 | Not Req. | Not Req. | Attach to R4A. |
| R5A | 1Meg | | OCH262025-26 | AB-50 | A47-1Meg-6 | QU-137 | TA16L | Vert. Linearity |
| B | Shaft | | Not Req. | AK-1 | FS3-1 | Not Req. | Not Req. | Attach to R5A. |
| R6A | 7.5Meg | | OCH262025-31 | AB-59 | A47-7.5Meg-8 | QU-142 | | Hinge |
| B | Shaft | | Not Req. | AK-4 | FS3-1 | Not Req. | | Attach to R6A. |

Note 1. Some versions will use an alternate control Part No. 262054-1.
* Concentrikit Equivalent, K-6 Kit, Base Elements and Shafts; B17-139 & P17-128 (Panel)
B18-133 & K1-214 (Rear)
76-1 (Switch)

## RESISTORS

**All wattages 1/2 watt, or less, unless otherwise listed.**

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | BENDIX PART No | IRC PART No. | |
| R7 | 220K | | | BTS-2200 | |
| R8 | 5600Ω | | | BTS-5600 | |
| R9 | 1Meg | | | BTS-1Meg | |
| R10 | 750K | | | BTS-750K 5% | |
| R11 | 120K | | | BTS-120K | |
| R12 | 150K | | | BTS-150K | |
| R15 | 150K | | | BTS-150K | |
| R14 | 33K | | | BTS-33K | |
| R15 | 68000 | | | BTS-6800 | |
| R16 | 470K | | | BTS-470K | |
| R17 | 2200Ω | | | BTS-2200 | |
| R18 | 2200Ω | | | BTS-2200 | |
| R19 | 100Ω | | | BTS-100 | |
| R20 | 2200Ω | 1 | RC34A222K | BTA-2200 | |
| R21 | 150Ω | | RC32A151K | BTS-150 | |
| R22 | 560K | | RC32A564K | BTS-560K | |
| R23 | 1.6Meg | | RC32A165K | BTS-1.6Meg | |
| R24 | 680K | | RC32A684K | BTS-680K | |
| R25 | 120K | | RC32A124K | BTS-120K | |
| R26 | 12KΩ 5% | | RC32A123J | BTS-2200 | |
| R27 | 2200Ω | | RC32A222K | BTA-2200 | |
| R28 | 150Ω | | RC32A151K | BTS-150 | |
| R29 | 47Ω | | RC32A470K | BTS-47 | |
| R30 | 150Ω | | RC32A151K | BTS-150 | |
| R31 | 150Ω | | RC32A151K | BTS-150 | |
| R32 | 47Ω | | RC32A470K | BTS-47 | |
| R33 | 150Ω | | RC32A151K | BTS-150 | |
| R34 | 150Ω | | RC32A151K | BTS-150 | |
| R35 | 100Ω | | RC32A101K | BTS-100K | |
| R36 | 1Meg | | RC32A105K | BTS-1Meg | |
| R37 | 2200Ω | 1 | RC34A222K | BTA-2200 | |
| R38 | 2200Ω | 2 | RC35A222K | BTB-2200 | |
| R39 | 82Ω | | RC32A820K | BTS-82 | |
| R40 | 47K | | RC32A473K | BTS-47K | |
| R41 | 100K | | RC32A104K | BTS-100K | |
| R42 | 22K | | RC32A223K | BTS-22K | |
| R43 | 8200Ω | | RC32A822K | BTS-8200 | |
| R44 | 8200Ω | 1 | RC34A822K | BTA-8200 | |
| R45 | 180Ω | | RC32A181K | BTS-180 | |
| R46 | 47KΩ | | RC32A473K | BTS-47K | |
| R47 | 12KΩ | | RC32A123K | BTS-12K | |
| R48 | 10Meg | | RC32A106K | BTS-10Meg | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | BENDIX PART No | IRC PART No. | |
| R49 | 270K | | RC32A274K | BTS-270K | |
| R50 | 910K 5% | | RC32A914J | BTS-910K 5% | |
| R51 | 82K 5% | | RC32A823J | BTS-82K 5% | |
| R52 | 100 | | | BTS-10 | Note 1 |
| R53 | 270Ω | 2 | RC35A271K | BTB-270 | |
| R54 | 5600Ω | | 268010-1 | | |
| R55 | 33K | | RC32A333K | BTS-33K | |
| R56 | 150K | | RC32A154K | BTS-150K | |
| R57 | 2.5Meg | | RC32A255K | BTS-2.5Meg | |
| R58 | 82K | | RC32A823K | BTS-82K | |
| R59 | 5600Ω | | RC32A562K | BTS-5600 | |
| R60 | 10K | 1 | RC34A103K | BTA-10K | |
| R61 | 4700Ω | | RC32A472K | BTS-4700 | |
| R62 | 3300Ω | | RC32A332K | BTS-3300 | |
| R63A | 22K | | | BTS-22K | |
| B | 8200Ω | | †374310-1 | BTS-8200 | |
| C | 6300Ω | | | BTS-6300 | |
| R64 | 4700Ω | | RC32A472K | BTS-4700 | |
| R65 | 150Ω | | RC32A151K | BTS-150 | |
| R66 | L.2Meg | | RC32A125K | BTS-1.2Meg | |
| R67 | 680Ω | 1 | RC34A681K | BTA-680 | |
| R68 | 3300Ω | 2 | RC35A332K | BTB-3300 | |
| R69 | 1000Ω | 1 | RC34A102K | BTA-1000 | |
| R70 | 1000Ω | | RC32A102K | | |
| R71 | 1000Ω | | RC32A102K | | |
| R72 | 1000Ω | | RC32A104K | | |
| R73 | 150Ω | | RC32A104K | | |
| R74 | 100KΩ | | RC32A104K | | |
| R75 | 180 | 2 | RC35A181K | | |
| R76 | 4.7Meg | | RC32A475K | BTS-4.7Meg | |
| R77 | 5600Ω | 1 | RC34A562K | | |
| R78 | 2200Ω 5% | | RC32A223J | BTS-2200 5% | |
| R79 | 82K | | RC32A823K | BTS-82K | |
| R80 | 10K | | RC32A104K | | |
| R81 | 4700Ω | | RC32A472K | BTS-4700 | |
| R82 | 100Ω | | RC32A101K | | |
| R83 | 470K | | RC32A474K | | |
| R84 | 15K | 2 | RC35A153K | BTB-15K | |
| R85 | 47Ω | 1 | RC34A470K | BTA-47 | |
| R86 | 5.3Ω | | 268000-033 | BW1-5.3 | |
| R87 | 6.8Ω | | 268000-068 | BW1-6.8 | |
| R88 | 220K | 1 | RC34A224K | BTA-220K | |

Note 1. Not used in some versions.
† Items R63A, R63B, R63C, C67A, C67B, C67C are combined in one unit.

## TRANSFORMER (POWER)

| ITEM No | RATING | | | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | BENDIX PART No. | Halldorson PART No | Merit PART No. | Stancor PART No | Thordarson PART No | Triad PART No | |
| T1 | 117VAC | 560VCT | 6V | 6.3V | 268105-3 | | | | | | |
| | ② 1.46A | ② .170A | ② 3A | ② 9.5A | | | | | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI | SEC | BENDIX PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T6 | 2KΩ | 3-4Ω | 265108-1 | Z1001 | A2928 | A3976 | 24S50 | S-1X | |

## TRANSFORMER (IMPEDANCE MATCHING)

| ITEM No | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI | SEC | BENDIX PART No | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T7 | 4Ω | 1.5Ω | Part of Speaker 256029-1 | | | | | | |

## SPEAKER

| ITEM No. | RATINGS | | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | | BENDIX PART No. | QUAM PART No. | RCA TYPE No | |
| SP1 | 10" | PM | 3-4Ω | | 256029-1 ① | 10A3J | 23S51 | ① Used in Models K2250, K2250U, K2251, |
| SP2 | 4"x 6" | PM | 3-4Ω | | 256030-2 | 4S4J | 22T91 | K2251U. |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | BENDIX PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | VHF Ant. Trans. | .1Ω | 00CT | | | | | |
| L2 | VHF Ant. Coil | 0Ω | | | | | | |
| L3 | VHF Ant. Coils | 0Ω | | | | | | |
| L4 | UHF IF Coil | 0Ω | | | | | | |
| L5 | RF Coil | 0Ω | | | | | | |
| L6 | FIL. Choke | 0Ω | | | | | | |
| L7 | Neut. Coil | 0Ω | | | | | | |
| L8 | VHF RF Coil | 0Ω | | | | | | Channel 13 |
| L9 | VHF RF Coils | 0Ω | | | | | | |
| L10 | VHF RF Trans. | 0Ω | 0Ω | | | | | Channel 8 |
| L11 | UHF IF Trans. | 0Ω | 0Ω | | | | | |
| L12 | VHF Mixer Grid Coil | 0Ω | | | | | | Channel 13 |
| L13 | VHF Mixer Grid Coils | 0Ω | | | | | | |
| L14 | FIL. Choke | 0Ω | | | | | | |
| L15 | VHF Osc. Coil | 0Ω | | | | | | Channel 13 |
| L16 | VHF Osc. Coils | 0Ω | | | | | | |
| L17 | VHF Osc. Coil | 0Ω | | | | | | Channel 8 |
| L18 | RF Coil | 0Ω | | | | | | |
| L19 | Conv. Plate | .3Ω | | | | | | |
| L20 | 4.5Mc IF | .1Ω | | 256197-3 | | | | Includes 47.5MC Trap |
| L21 | 2nd Video IF | .1Ω | .1Ω | 256144-1 | | 17-4823 | TV-130 | 6319 |
| L22 | 3rd Video IF | .1Ω | .1Ω | 256145-3 | | 17-4823 | TV-130 | 6319 |
| L23 | Shunt Peaking Coil | 12Ω | | 256130-13 | | 19-3300 | | 6133 330 Microhenries |
| L24 | Series Peaking Coil | 2.7Ω | | 256150-1 | | 19-8033 | | 6153 82.5 Microhenries |
| L25A | 4.5MC Trap | 4Ω | | | | | | |
| B | Sound IF | .9Ω | | 256165-1 | | | | |
| L26 | Shunt Peaking Coil | 14Ω | | 256130-14 | | 19-6400 * | | 6134 * 190 Microhenries; Wound on 6.2KΩ resistor |
| L27 | Series Peaking Coil | 8Ω | | 256130-13 | | 19-3300 ■ | | 6130 ■ 180 Microhenries; Wound on 68KΩ resistor |
| L28 | Ratio Det. | 7.3Ω | 10CT | 256156-3 | | 17-3497 | TV-15 | 6305 Tertiary Winding, 8Ω |

* Parallel with 8.2KΩ resistor.
■ Parallel with 68KΩ resistor.

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC | BENDIX PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | RCA TYPE No. | Barn PART No. | Thordarson PART No. |
| L29 | 48Ω | | 256121-1 | 19-1576 | TV-163 | 6210 | | | HS-5 |

## FILTER CHOKE

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL CURRENT | D.C. RESISTANCE | INDUCTANCE @ CURRENT 1000 ℃/) | BENDIX PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No | Triad PART No |
| L30 | .170A | 55Ω | L=7HY | 265093-3 | C5040 | C3994 | C2325 ① | 26C43 ① | C-3X ① |

① Drill one new mounting hole.

## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | BENDIX PART No. | | LITTELFUSE PART No. | | BUSS PART No. | |
| | | | FUSE | HOLDER | FUSE | HOLDER | FUSE | HOLDER |
| M1 | N | 3A | 306266-68 | | 335002. | 34001? | N2 | HN 1 3/4-2 1/2 |
| M2 | 3AG | 1.25V 1/4A 250V | 306169-25 | | 312.250 (3AG 1/4A) | 357001 | AGC 1/4 | 4405 |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | |
|---|---|---|---|---|
| | | BENDIX PART No. | SYLVANIA PART No. | NOTES |
| M3 | IN295 * | 250901-2 | 1N60 | Video Det. (Clip in) |

* Some versions may use crystal diode type CK706A in this application.

## MISCELLANEOUS

| ITEM No | PART NAME | BENDIX PART No. | NOTES |
|---|---|---|---|
| M4 | Dial Light | | #47 |
| M5 | Tuner | 259067-5 | VHF-Chassis T20, T30-L Not used in some versions. |
| | Tuner | 259057-8 | VHF-Chassis T20, T30-L Not used in some versions. |
| | Tuner | 259061-2 | UHF-Chassis T20, T30-L Not used in some versions. |
| M6 | Tuner | 259067-8 | UHF-Chassis T30-l only. Not used in some versions. |
| | Tuner | 259067-3 | UHF-Chassis T20-l only. Not used in some versions. |
| | Tuner | [illegible] | UHF-Chassis T20-l only. Not used in some versions. |
| M7 | Video Det. Assy. | 259166-2 | Includes M3, Coils, Capacitor, & Resistor |
| M8 | Centering Device | | Part of Deflection Yoke (T5) Rear Cover |
| M9 | Dial | 274197-M | |
| | Dial | 259114-1 | UHF-Models T2150U, T2151U, K2250U, K2251U |
| | Safety Glass | 257503-13 | |
| | Mask | 259136-1 | |

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No | USE | REPLACEMENT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | BENDIX PART No | Halldorson PART No | Merit PART No. | RCA TYPE No | Barn PART No | Stancor PART No | Thordarson PART No | Triad PART No |
| T2 | Vert. Osc. Trans. | 255094-2 | B6702 | A-3003 | 20971 ① | V405 | A-8125 | 26A03 | A-97X |
| T3 | Horiz. Output Trans. | 265112-1 ② 265111-1 ③ | FB460 * ① | RVO-38 * ① | 23C71 * ① | 3060 * ① | A-8254 * ① | FLY-75 * ① | D-49 * ① |
| T4 | Vert. Output Trans. | 265110-1 | Z1804 | A-3037 | 22C71 | V313 | A-8123 | 26D52 | A-102X |
| T5A | Yoke-Horiz.(5.5MH) | 265095-5 ③ | DF905 ④ | MDF-173 ④ | 21ZD3 ④ | V70F17 ④ | DY-15A ③ | Y-9 ③ | Y-23-1 ④ |
| B | Vert. (51MH) | | | | | | | | |

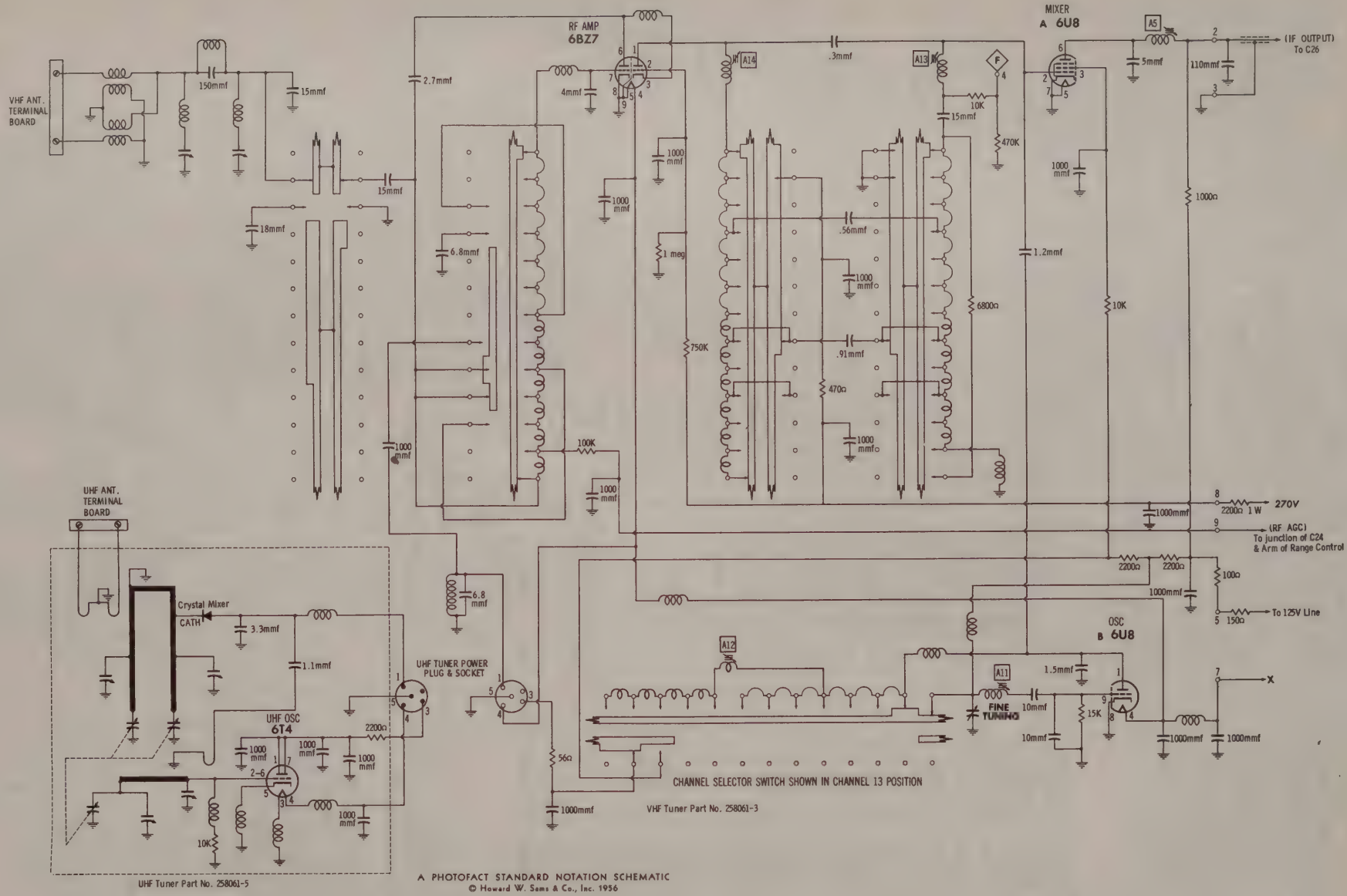
① Drill new mounting hole(s).
② Alternate Hendix part number.
③ Includes plug, rear cover and centering device, capacitor C76, resistors R70 and R71.
④ Use original rear cover and centering device.
⑤ Connect horizontal damping network across terminals #3 and #7. Use original if necessary.
⑥ Connect horizontal yoke terminal #3 to yoke plug pin #5, horizontal yoke terminal #1 to plug pin #6.
⑦ Remove capacitor from terminals #1 and #3. Use original horizontal damping network if necessary.

## *HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original With Coil Unless Replacement Type Is Listed

| Terminal Identification | Halldorson Replacement Connections | Merit Replacement Connections | RCA Replacement Connections | Barn Replacement Connections | Stancor Replacement Connections | Thordarson Replacement Connections | Triad Replacement Connections |
|---|---|---|---|---|---|---|---|
| 3 | 5 | 5 | 9 | 9 | 5 | 5 | 5 |
| 2 | 4 | 4 | 5 | 5 | 4 | 4 | 8 |
| 1 | 3 | 3 | 1 | 1 | 3 | 3 | 2 |
| Special Notes | | | | ⑤ | | | |

⑤ Jumper terminals #8 and #7.


VHF ANT. TERMINAL BOARD
RF AMP 6BZ7
MIXER A 6U8
OSC B 6U8
UHF ANT. TERMINAL BOARD
Crystal Mixer
CATH
UHF OSC 6T4
UHF TUNER POWER PLUG & SOCKET
FINE TUNING
(IF OUTPUT) To C26
270V
(RF AGC) To junction of C24 & Arm of Range Control
To 125V Line
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
VHF Tuner Part No. 258061-3
UHF Tuner Part No. 258061-5

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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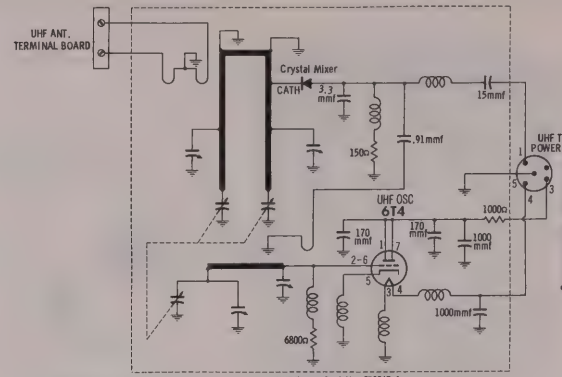
# ALTERNATE VHF-UHF TUNER SCHEMATIC




A PHOTOFACT STANDARD NOTATION SCHEMATIC

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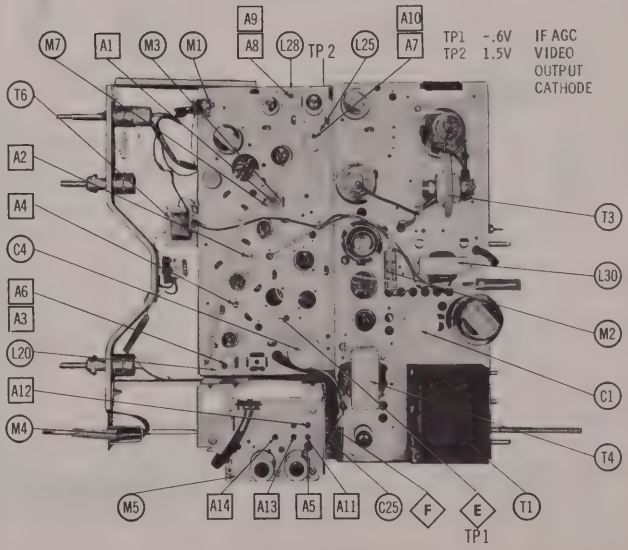
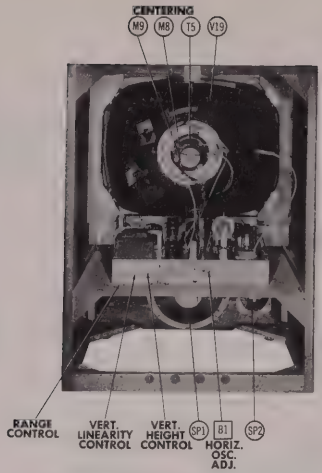
## UHF TUNER SCHEMATIC




## CHASSIS TOP VIEW




## CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

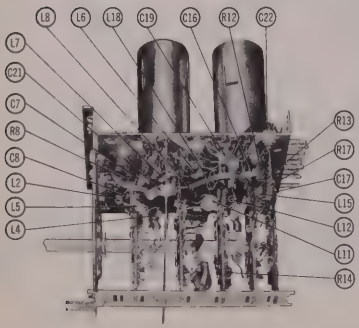
Set the horizontal hold control at the mid-position of its range.

Set the contrast control for normal operation .

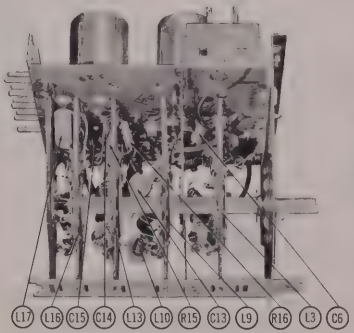
Adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

Turn the horizontal hold control to each extreme end of its rotation to see that the sync range is centered.

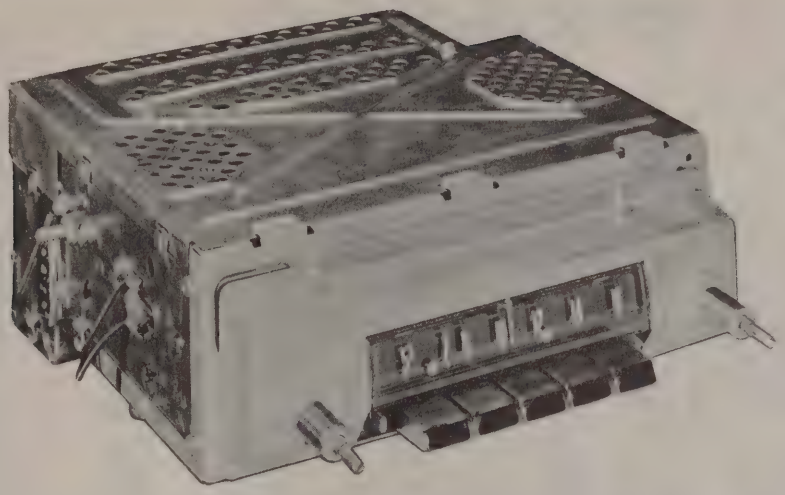
If necessary, a slight readjustment of B1 should give the desired effect.




RF TUNER RIGHT SIDE




RF TUNER LEFT SIDE



FORD MODELS 69MF
(FDR-108806-F), 69MS (FEF-18805-B)

| | |
|---|---|
| TRADE NAME | Ford Models 69MF (FDR-108806-F), 69MS (FEF-18805-B) (For 1956 Ford Automobiles) |
| MANUFACTURER | Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill. |
| TYPE SET | Battery Operated Custom Built AM Superheterodyne Automobile Receiver |
| TUBES (Nine) | Types 12BA6 RF Amplifier, 12BE6 Converter, 12AU6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 12AV6 Phase Inverter, (2) 12AB5 Output, 12AU7 Trigger, 12X4 Rectifier |
| POWER SUPPLY | 12 Volt Storage Battery — RATING 3.6 Amp. @ 12.6 Volts DC |
| TUNING RANGE—BROADCAST | 540KC-1600KC |

ALIGNMENT INSTRUCTIONS

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis. | 265KC (400~ Mod.) | High Frequency End Stop | DC probe to point (A). Common to chassis. | A2, A3, A4 | Adjust for maximum deflection. |
| 2. | " | " | " | " | " | A1 | Adjust for MINIMUM deflection. |
| 3. | Fig. 1 | Thru dummy to antenna receptacle | 1610KC | " | " | A5, A6, A7 | Adjust for maximum deflection. |
| 4. | " | " | 1020KC | Adjust pointer manually 49/64" from high freq. end stop. | " | A8, A9, A10 | Adjust for maximum deflection. Use alignment tool similar to Fig. 2. Repeat steps 2 & 3. |

WITH RECEIVER INSTALLED IN CAR AND ANTENNA FULLY EXTENDED, TUNE IN A WEAK STATION NEAR 1400KC AND ADJUST A7 FOR MAXIMUM VOLUME.

POINTER CALIBRATION

Tune receiver to a 1000KC signal and rotate pointer adjustment cam until pointer coincides with calibration mark on dial background.

PUSHBUTTON ADJUSTMENT

(MODEL 69MF)
1. Pull pushbutton out.
2. Tune manually todesired station.
3. Reset by pressing in pushbutton firmly.
4. Repeat for remaining pushbuttons.

(MODEL 69MS)
1. Loosen pushbutton by turning counter clockwise one turn.
2. Tune manually to desired station.
3. Reset by pressing in pushbutton firmly and turning clockwise one turn.
4. Repeat for remaining pushbuttons.

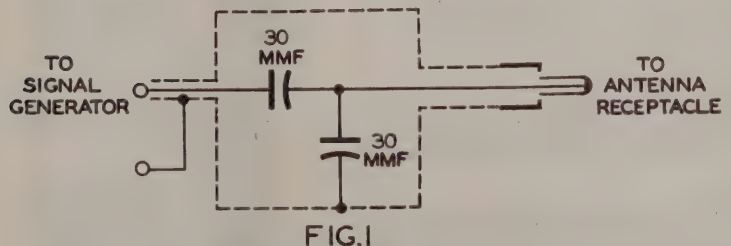



FIG. 1

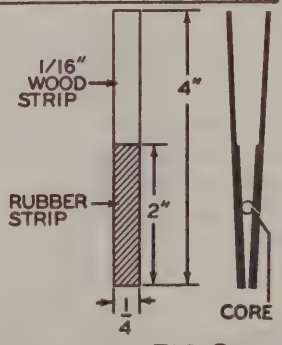



FIG. 2

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# PARTS LIST AND DESCRIPTIONS

## TUBES (GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amplifier | 12BA6 | |
| V2 | Converter | 12BE6 | |
| V3 | IF Amplifier | 12AU6 | |
| V4 | Det.-AVC-AF Amp. | 12AV6 | |
| V5 | Phase Inverter | 12AV6 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V6 | Output | 12AB5 | |
| V7 | Output | 12AB5 | |
| V8 | Trigger | 12AU7 | |
| V9 | Rectifier | 12X4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | MOTOROLA PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | ■ 20 | 350 | 23A532094 | AFH3-107 | C080 | FP345.8 | TMT-92 | T-470 | R1134 * |
| B | ▲ 20 | 350 | | | | | | | |
| C | 20 | 25 | | | | | | | |

* Non-catalogue item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | MOTOROLA PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | 1500 | | 21K122498 | BPD-0015 | DD-152 | | 801-0015 | DC-5215 | 5HK-D15 | |
| C3 | 100 | | 21R410036 | N750-DI100 | TCN-100 | | N750L-101 | NT-531 | 5TCU-T1 | |
| C4 | .05 | 200 | 8R121005 | BPD-05 | DF-503 | | | PT415 | 2TM-S5 | |
| C5 | 5000 | | 21R122871 | BPD-005 | DD-502 | | 811-005 | DC-525 | 5HK-D5 | |
| C6 | .05 | 400 | 8R121567 | BPD-05 | DF-503 | | | PT415 | 4TM-S5 | |
| C7 | 51 | | 21R120558 | | TCZ-51 | | NPO-338-510 | | | |
| C8 | 100 | | 21R115042 | | | | | | | |
| C9 | .05 | 200 | 8R121005 | BPD-05 | DF-503 | | | PT415 | 2TM-S5 | |
| C10 | 100 | | 21R410036 | N750-DI100 | TCN-101 | | N750L-101 | NT-531 | 5TCU-T1 | |
| C11 | 10000 | | 21R482726 | BPD-01 | DD-103 | | 811-01 | DC-511 | 5HK-S1 | |
| C12 | .015 | 200 | 8R122256 | BPD-015 | DDI6-153 | | 817-015 | PT6115 | 4TM-S15 | |
| C13 | .001 | 600 | 8R122103 | SI1000 | D6-102 | | GP2L-102 | PT621 | 6TM-D1 | |
| C14 | 220 | | 21K121698 | DI-00022 | DD-221 | | 811-221 | UC-5322 | 5GA-T22 | |
| C15 | .01 | 400 | 8R121002 | BPD-01 | D6-103 | | GP3-333-103 | PT411 | 4TM-S1 | |
| C16 | 220 | | 21K121698 | DI-00022 | DD-221 | | 811-221 | UC-5322 | 5GA-T22 | |
| C17 | .01 | 400 | 8R121002 | BPD-01 | DD-103 | | 811-01 | DC-511 | 5HK-S1 | |
| C18 | 100 | | 21R120576 | SI100 | D6-101 | | GP1K-101 | UC-531 | 5GA-T1 | |
| C19 | .002 | 600 | 8R121568 | SI2000 | D6-202 | | GP2-333-202 | UC-522 | 5HK-D2 | |
| C20 | .04 | 1000 | 8A121549 | | | | | | | |
| C21 | .5 | 100 | 8K122076 | VHC36 | | | | RF480 | 68P20 | |
| C22 | .5 | 100 | 8K122076 | VHC36 | | | | RF480 | 68P20 | |

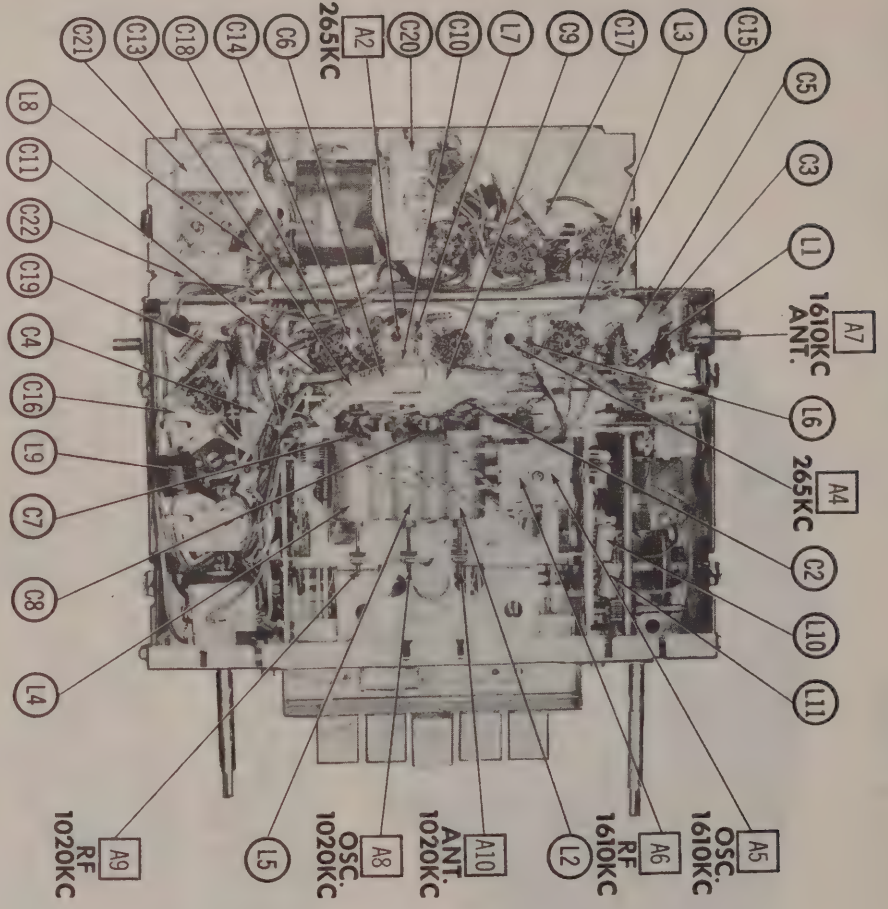
## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | MOTOROLA PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 2Meg | ½ | 18B534483 | | | * QJ-891A | UE1744S | Tone (Panel) |
| B | 500K | ½ | | | | | | Vol. & Sw. (Rear) Tapped ② 150K |
| R1A | 2Meg | ½ | 18B536439 | F1-67 | RTV-593C | | UF26L | Tone (Panel) Note 1 |
| B | 500K | ½ | | R2-45 | | | UR55-T154 | Volume (Rear) Tapped ② 150K |
| R2 | 2000Ω | 2 | 18K520298 | | 39-2000 | | | Town Sensitivity (Wire Wound) |
| R3 | 1000Ω | 2 | 18A535812 | | 39-1000 | | | Normal Sensitivity (Wire Wound) |
| R4 | 20Ω | 2 | 18A537014 | | 39-50 | | | Motor Speed |

Note 1. Used in Model 69MS only.

* Concentrikit Equivalent, K-6 Kit, Base Elements and Shafts; B11-139 & P14-214 (Panel)
B13-133X & R1-228 (Rear)
76-2 (Switch)

# CHASSIS—BOTTOM VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | MOTOROLA PART No. | IRC PART No. | |
| R5 | 2.2Meg | 1 | 6R3927 | BTS-2.2Meg | |
| R6 | 10K | | 6R6430 | BTA-10K | |
| R7 | 150Ω | | 6R3992 | BTS-150 | |
| R8 | 330K | | 6R6014 | BTS-330K | |
| R9 | 47K | | 6R6068 | BTS-47K | |
| R10 | 1.5Meg | | 6R6460 | BTS-1.5Meg | |
| R11 | 22K | 1 | 6K337008 | | Note 1 |
| R12 | 470Ω | | 6R3949 | BTS-470 | |
| R13 | 100K | | 6R6075 | BTS-100K | |
| R14 | 33K | | 6R6012 | BTS-33K | |
| R15 | 10Meg | | 6R3109 | BTS-10Meg | |
| R16 | 1Meg | | 6R6004 | BTS-1Meg | |
| R17 | 12K | | 6R6394 | BTS-12K | |
| R18 | 1Meg | | 6R6004 | BTS-1Meg | |
| R19 | 2200Ω | | 6R6290 | BTS-2200 | |
| R20 | 330K | | 6R3096 | BTS-330K | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | MOTOROLA PART No. | IRC PART No. | |
| R21 | 330K | | 6R3096 | BTS-330K | |
| R22 | 180Ω | 1 | 6R6390 | BTA-180 | |
| R23 | 100Ω | | 6R6326 | BTS-100 | |
| R24 | 2200Ω | | 6A533220 | | Note 1 |
| R25 | 6800Ω | | 6R6423 | BTS-6800 | |
| R26 | 470K | | 6R6032 | BTS-470K | |
| R27 | 1Meg | | 6R6046 | BTS-1Meg | |
| R28 | 1.5Meg | | 6R6460 | BTS-1.5Meg | |
| R29 | 5.6Meg | | 6R3988 | BTS-5.6Meg | |
| R30 | 560Ω | | 6R6291 | BTS-560 | |
| R31 | 4700Ω | 1 | 6R5578 | BTA-4700 | |
| R32 | 47K | 1 | 6R6463 | BTA-47K | |
| R33 | 120K | | 6R6631 | BTS-120K | |
| R34 | 10K | 1 | 6R6430 | BTA-10K | |
| R35 | 47K | 1 | 6R6463 | BTA-47K | |

Note 1. Non-insulated type resistor.

## TRANSFORMER (VIBRATOR)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | MOTOROLA PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 12VCT @ 2A | 500VCT @ .073A | | | 25C534414 | V3903 | P2978 | P6489 | 22R52 | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | MOTOROLA PART No. | Halldorson PART No. | Merit PART No | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | 5.4KΩ | 3-4Ω | 25B534603 | | | | | | |

## SPEAKER

| ITEM No. | RATINGS | | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | | MOTOROLA PART No. | QUAM PART No. | RCA TYPE No. | |
| SP1 | 8"x 9" | PM | 3-4Ω | | 50D530699 | 69A2 | 23BS1 | |

## COILS (RF-IF)

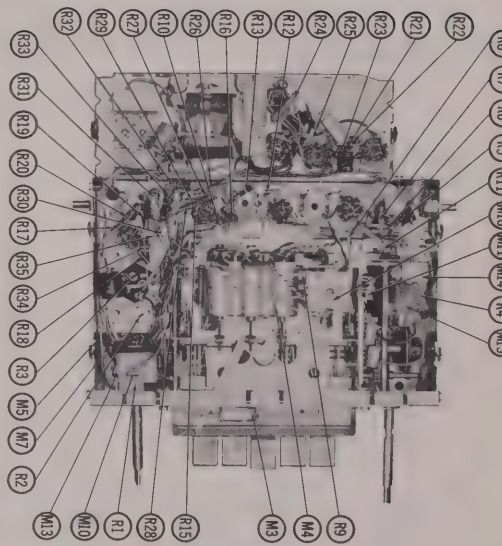
| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | MOTOROLA PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Ant. Loading Coil | 4.8Ω | | 24A532148 | 19-6033 | | | 31 Microhenries |
| L2 | Ant. Coil | 1Ω | | 24C536308 | | | | Note 1 |
| L3 | IF Trap | | | 24K535786 | | | | Includes Cap. |
| L4 | RF Coil | 9.5Ω | | 24C536306 | | | | Note 1 |
| L5 | Osc. Coil | 1Ω | 3.5Ω | 24B536300 | | | | Note 1 |
| L6 | Input IF | 33Ω | 33Ω | 24B580183 | 16-6753 | BC-350 | 13-HI | |
| L7 | Output IF | 33Ω | 33Ω | 24B533073 | 16-6754 | BC-354 | 13-H6 | |
| L8 | Vib. Hash Choke | .1Ω | | 24A534494 | | | | 21.2 Microhenries |
| L9 | Fil. Choke | .3Ω | | 24K535787 | | | | 117 Microhenries (Note 2) |
| L10 | Hash Choke | .1Ω | | 24A535789 | | | | 3 Microhenries |
| L11 | Hash Choke | .1Ω | | 24A535789 | | | | 3 Microhenries |

Note 1. Part of complete assembly M4.
Note 2. Part No. 24K536287 used in Model 69MS (FEF-16805-B).

## VIBRATOR

| ITEM No. | TYPE | INPUT VOLTS | FREQUENCY | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | MOTOROLA PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | RADIART PART No. | |
| M1 | Interrupter | 12 VDC | 115 | 4BB533000 | 6301 | G859 | 6326 | |

## CHASSIS—BOTTOM VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## FUSES

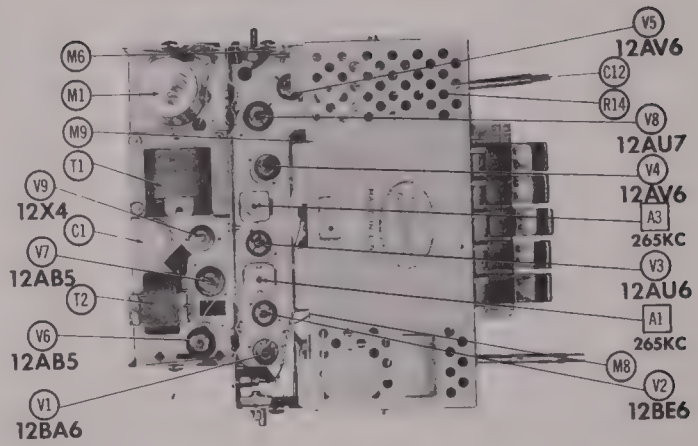
| ITEM No. | TYPE | RATING | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | MOTOROLA PART No. | | LITTELFUSE PART No. | | BUSS PART No. | |
| | | | FUSE | HOLDER | FUSE | HOLDER | FUSE | HOLDER |
| M2 | 7AG | 7½A | 65R122346 | 9K534967 | 30307.5 (7AG 7½A) | 155009 | AGW 7½ | HRH |

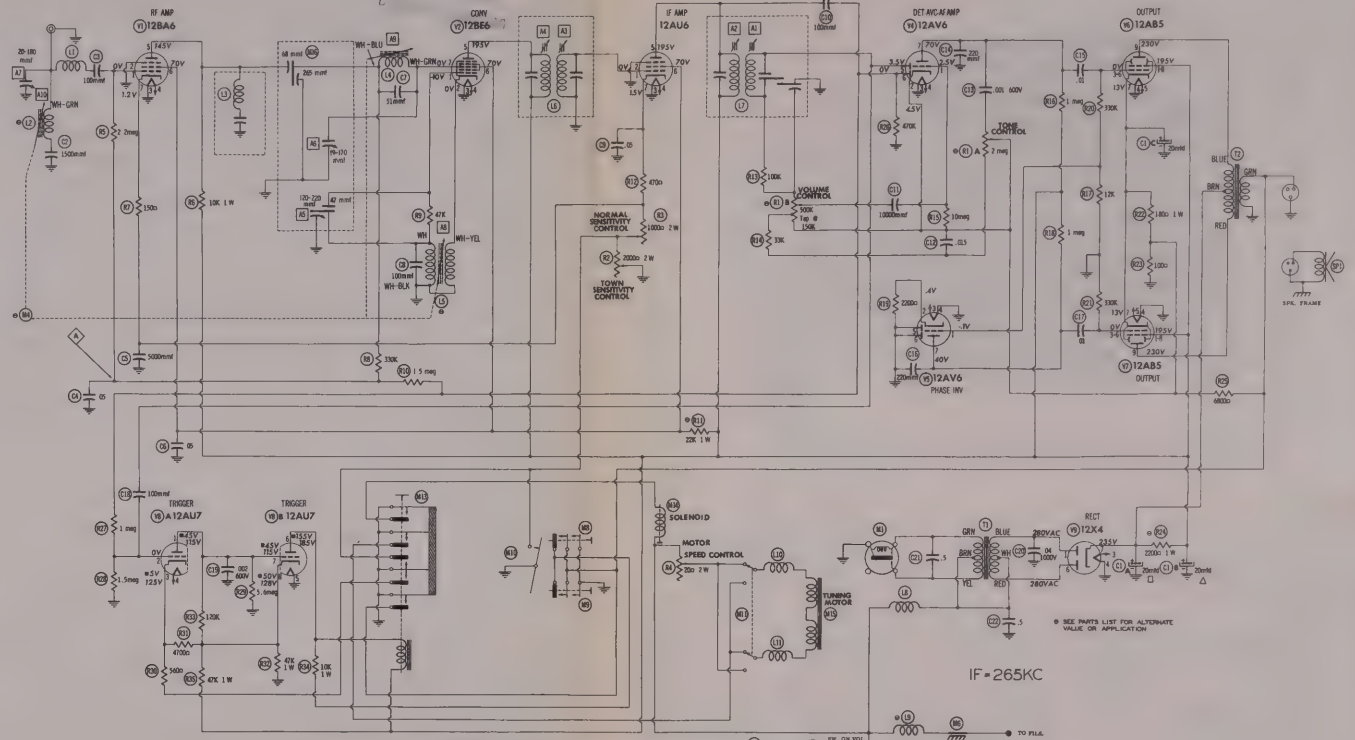
## MISCELLANEOUS

| ITEM No. | PART NAME | MOTOROLA PART No. | NOTES |
|---|---|---|---|
| M3 | Dial Light | 65T535060 | #57X |
| M4 | Tuner | 77E535500 | Permeability (Complete) Model ST-162- Includes L2, L4, L5. Used in Model 69MF only. |
| (or) | | | |
| M4 | Tuner | 77E536380 | Permeability (Complete) Model ST-175.- Includes L2, L4, L5. Used in Model 69MS only. |
| M5 | Spark Plate | 64K532087 | 12.6V Battery Lead |
| M6 | Spark Plate | 64K532087 | Filament |
| M7 | Spark Plate | 64K532087 | Dial Light Lead |
| M8 | Switch | 40K535428 | Country Search Selector, Model 69MF (Note 1) |
| M9 | Switch | 40B535416 | Town Search Selector, Model 69MF (Note 1) |
| M10 | Switch | 40A535418 | Sensitivity, Model 69MF (Note 1) |
| M11 | Switch | 40B535396 | Motor Reversing, Model 69MF |
| | Switch | 40B536476 | Motor Reversing, Model 69MS |
| M12 | Switch | 40A536263 | On-Off-Model 69MS only |
| M13 | Relay | 80B535520 | |
| M14 | Solenoid | 59A535369 | Model 69MF |
| | Solenoid | 59A537563 | Model 69MS |
| M15 | Motor | 59C535486 | |
| M16 | Trimmer Cap. | 20K533409 | Dual Trimmer; Osc. (A5) 120-220MMF, RF (A6) 19-170MMF. Unit also consists of 47MMF, 68MMF & 265MMF. |
| A7 | Trimmer Cap. | 20B534809 | Ant. (20-180MMF) |
| | Knob | 36B534451 | Tone & Dummy, Model 69MF |
| | Knob | 36B511457 | Tone & Dummy, Model 69MS |
| | Knob | 36A534450 | On-Off-Volume & Tuning, Model 69MF |
| | Knob | 36A530011 | Volume & Tuning, Model 69MS |
| | Pushbutton | 1A534901 | Station Selector (5 used), Model 69MF |
| | Pushbutton | 1A536303 | Station Selector (5 used), Model 69MS |
| | Pushbutton | 38K535875 | Country Search Selector, Model 69MF |
| | Pushbutton | 38B535138 | Town Search Selector, Model 69MF |
| | Pushbutton | 38K536293 | "Off", Model 69MS |
| | Dial Scale | 34C534864 | Model 69MF |
| | Dial Scale | 34C536273 | Model 69MS |

Note 1. In Model 69MS; M8, M9, and M10 with button assembly are included under one Part No. 1V536509.

## CHASSIS—TOP VIEW






RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 12BA6 | 4Meg | 0Ω | 0Ω | 1Ω | ↑ 12K | ↑ 24K | 150Ω | | |
| V2 | 12BE6 | 47K | 1Ω | 0Ω | 1Ω | ↑ 2200Ω | ↑ 24K | 2.2Meg | | |
| V3 | 12AU6 | 350 | 0Ω | 0Ω | 1Ω | ↑ 2200Ω | ↑ 24K | 470Ω | | |
| V4 | 12AV6 | 10Meg | 100Ω | 0Ω | 1Ω | 600KΩ | 400K | ↑ 1Meg | | |
| V5 | 12AV6 | 12K | 2200Ω | 1Ω | 0Ω | 0Ω | 0Ω | ↑ 1Meg | | |
| V6 | 12AB5 | ↑ 2200Ω | TP | 340K | 0Ω | 1Ω | 340K | 280Ω | ↑ 2280Ω | ↑ 160Ω |
| V7 | 12AB5 | ↑ 2200Ω | TP | 330K | 0Ω | 1Ω | 330K | 280Ω | ↑ 2280Ω | ↑ 160Ω |
| V8 | 12AU7 | ↑ 170K | 750K | ↑ 35K | 1Ω | 0Ω | ↑ 4500Ω | ↑ 170K | ↑ 50K | 6Ω |
| V9 | 12X4 | 250Ω | NC | 1Ω | 0Ω | TP | 250Ω | 100K | | |

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

* TOWN AND NORMAL SENSITIVITY CONTROLS SET AT MAXIMUM SENSITIVITY.
* TAKEN WITH AUTOMATIC TUNING RELAY IN CLOSED POSITION
↑ MEASURED FROM PIN 7 OF V9.
NC-NO CONNECTION
TP-TIE POINT

* SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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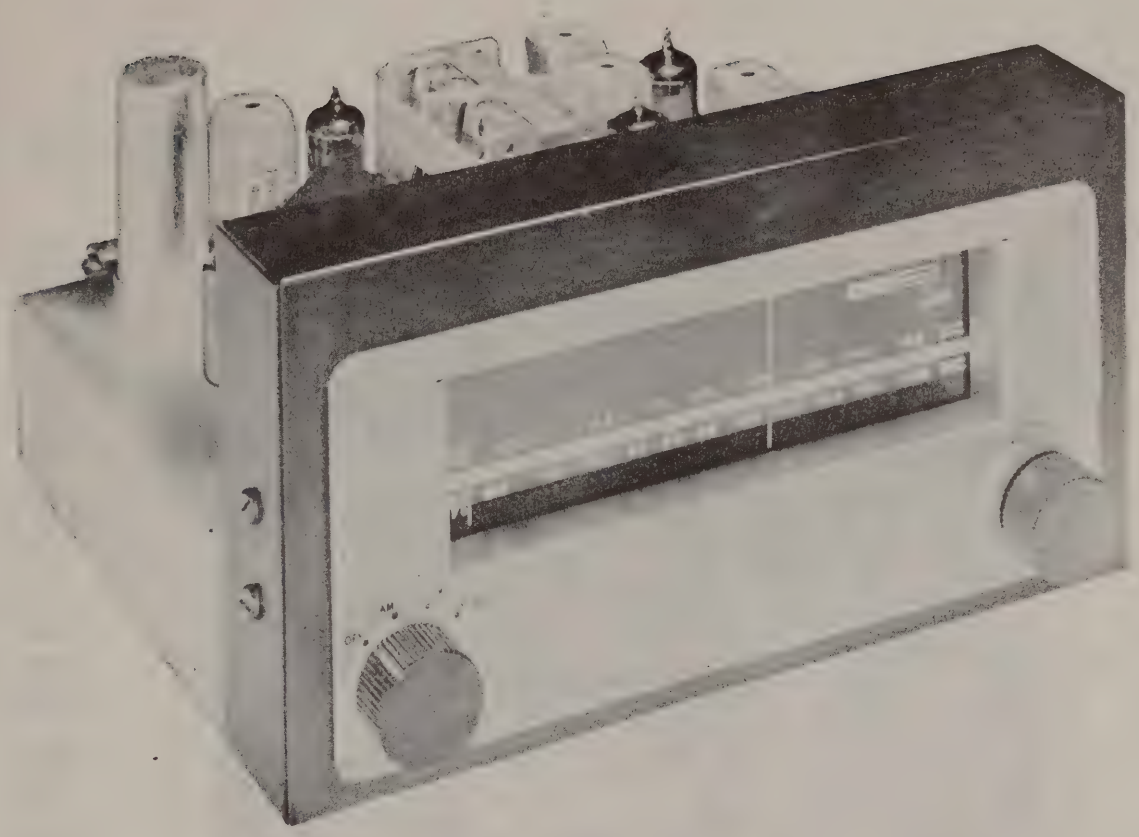
HARMAN-KARDON
MODEL A-200



HARMAN-KARDON
MODEL A-200

| | | |
|---|---|---|
| TRADE NAME | Harman-Kardon Model A-200 | |
| MANUFACTURER | Harman-Kardon, Inc., 520 Main St., Westbury, L.I., New York | |
| TYPE SET | AC Operated FM-AM Superheterodyne Tuner | |
| TUBES (Seven) | Types 12AT7 FM RF Amp.-FM Mixer, 12AT7 FM Osc.-FM AFC, 6BE6 AM Converter, 6BA6 FM-AM IF Amp., 6AU6 2nd. FM IF Amp.-AM Det.-AVC, 6AU6 FM Limiter, 6AL5 Discriminator | |
| POWER SUPPLY | 105-125 Volts AC-60 Cycles | RATING .22 Amp. @ 117 Volts AC |
| TUNING RANGE-BROADCAST | 530KC-1650KC | FREQ. MOD. 88MC-108MC |

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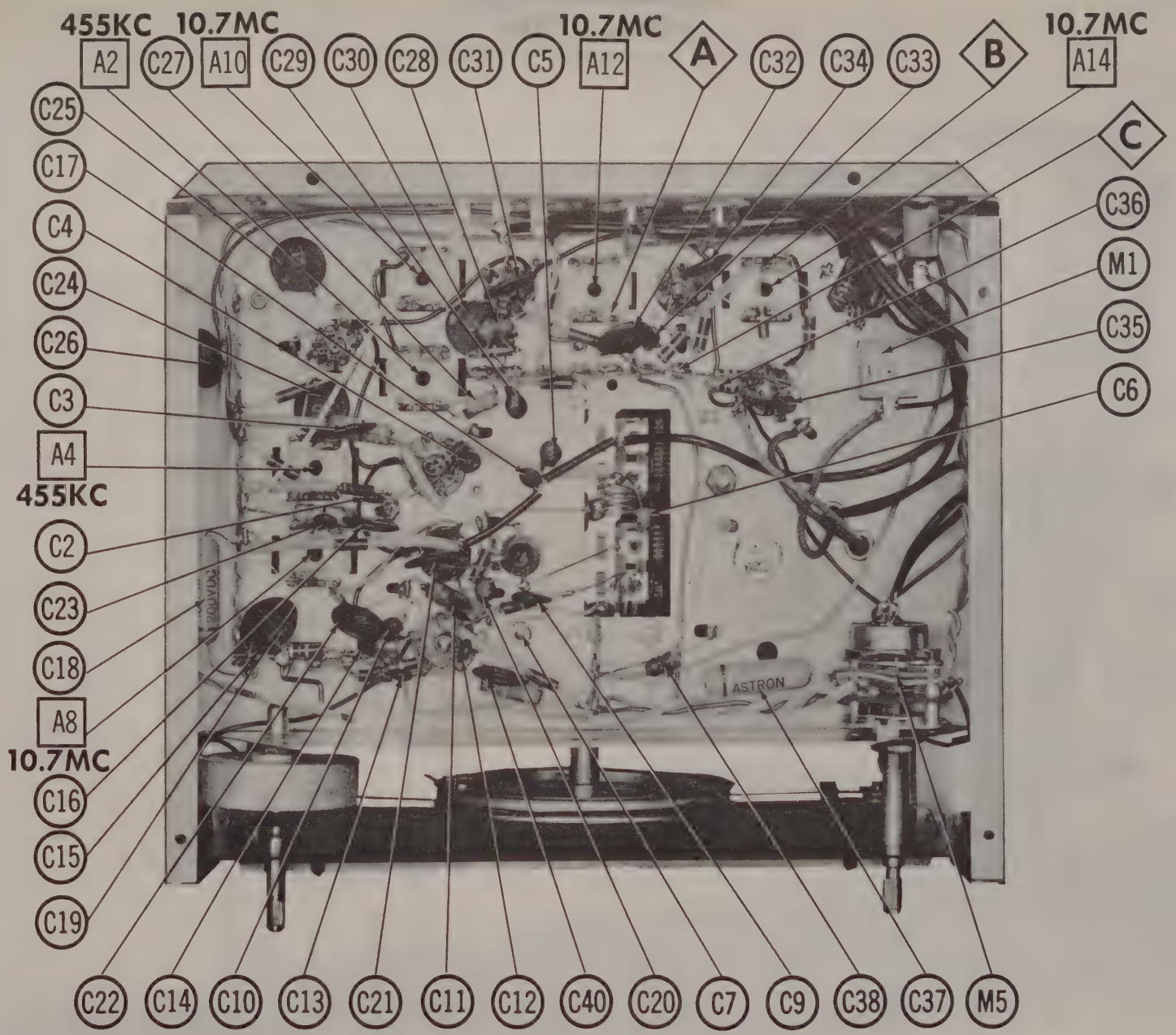
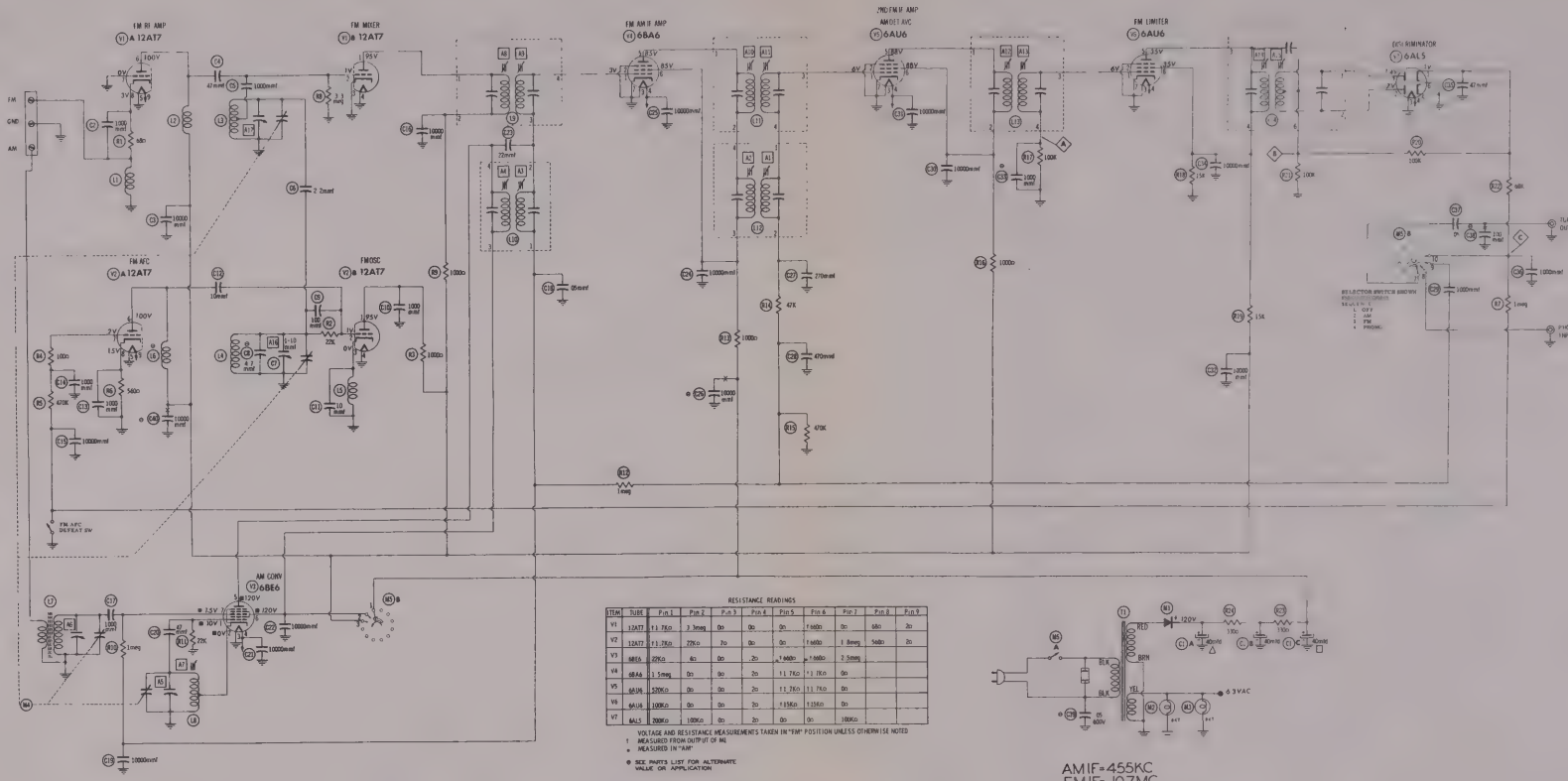



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION




| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 12AT7 | 11.7K Ω | 3.3meg | 0Ω | 0Ω | 0Ω | 160Ω | 0Ω | 68Ω | 2Ω |
| V2 | 12AT7 | 11.7K Ω | 22KΩ | 7Ω | 0Ω | 0Ω | 160Ω | 1.8meg | 56Ω | 2Ω |
| V3 | 6BA6 | 22KΩ | 4Ω | 0Ω | 2Ω | 160Ω | 160Ω | 2.5meg | | |
| V4 | 6BA6 | 11.5meg | 0Ω | 9Ω | 2Ω | 11.7KΩ | 11.7KΩ | 0Ω | | |
| V5 | 6AU6 | 520KΩ | 0Ω | 0Ω | 2Ω | 11.7KΩ | 11.7KΩ | 0Ω | | |
| V6 | 6AU6 | 100KΩ | 0Ω | 0Ω | 2Ω | 135KΩ | 135KΩ | 0Ω | | |
| V7 | 6AL5 | 200KΩ | 100KΩ | 0Ω | 2Ω | 0Ω | 0Ω | 100KΩ | | |

1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 ohms per volt.
3. Socket connections are shown as bottom view.
4. Line voltage maintained at 117 volts for voltage readings.
5. Printed resistor or component values may vary slightly due to variation of ± 5% in voltage and resistance readings.
6. Values could be at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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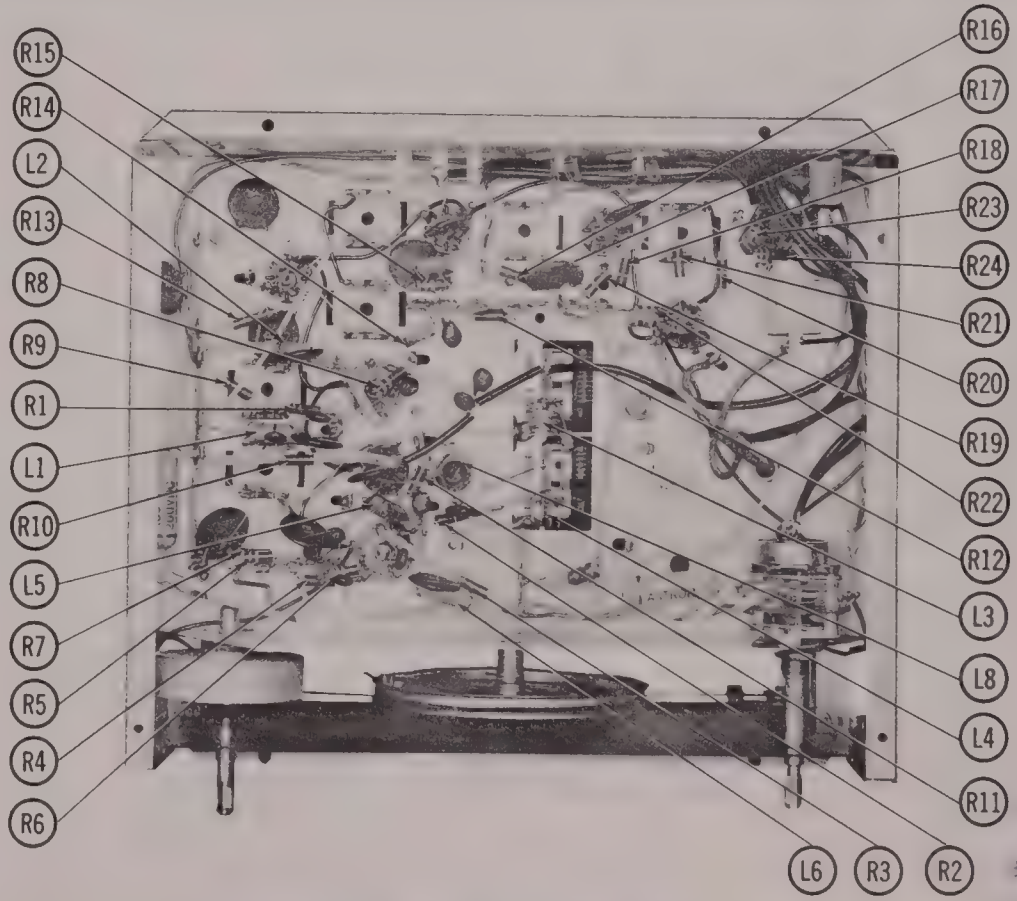
328-5




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

# ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS- READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

Use 100K resistor in series with DC probe.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .01MFD | High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis | 455KC (400% Mod) | AM | Point of non-interference | Across output terminal. | A1, A2, A3, A4 | Adjust for maximum deflection. |
| 2. | 01MFD | Across AM antenna terminals | 1500KC | " | 1500KC | " | A5, A6 | " |
| 3. | " | " | 600KC | " | Tune to 600KC signal | " | A7 | Adjust for maximum deflection while rocking tuning gang. |

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Use 100K resistor in series with DC probe.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 4. | .01MFD | High side to pin 2 (grid) of 12AT7 (V1). Low side to chassis. | 10.7MC (Unmod) | FM | Point of non-interference | DC probe thru 100K Ω to point (A). Common to chassis. | A8, A9, A10, A11, A12, A13 | Adjust for maximum deflection. |
| 5. | " | " | " | " | " | DC probe thru 100K Ω to point (B). Common to chassis. | A14 | " |
| 6. | " | " | " | " | " | DC probe thru 100K Ω to point (C). Common to chassis. | A15 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.
Use 100K resistor in series with vert. amplifier.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 4. | .01MFD | High side to pin 2 (grid) of 12AT7 (V1). Low side to chassis. | 10.7MC (450KC Swp) | FM | Point of non-interference | Vert. Amp. thru 100K Ω to point (A). Low side to chassis. | A8, A9, A10, A11 A12, A13 | Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. |
| 5. | " | " | " | " | " | Vert. Amp. thru 100K Ω to point (B). Low side to chassis. | A14 | " |
| 6. | " | " | " | " | " | Vert. Amp. thru 100K Ω to point (C). Low side to chassis. | A15 | Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A14 for maximum amplitude and straightness of cross-over lines. |

FM RF ALIGNMENT

Use 100K resistor in series with DC probe.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7 | 270Ω Carbon Resistor | High side thru 270Ω to FM antenna. Low side to chassis. | 106MC | FM | 106MC | DC probe thru 100KΩ to point (A). Common to chassis. | A16, A17 | Adjust for maximum deflection. |
| 8. | " | " | 90MC | " | 90MC | " | " | " |

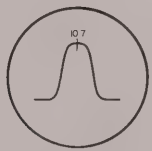



FIG. 1

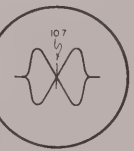



FIG. 2

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | FM RF Amp.-FM Mixer | 12AT7 | |
| V2 | FM Oscillator-AFC | 12AT7 | |
| V3 | AM Converter | 6BE6 | |
| V4 | FM-AM IF Amplifier | 6BA6 | |
| V5 | 2nd. FM IF Amplifier-AM Det.-AVC | 6AU6 | |
| V6 | FM Limiter | 6AU6 | |
| V7 | Discriminator | 6AL5 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA Harman-Kardon PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ▲40 | 150 | JE20635 | AFH3-10 | C009 | FP311.5 | TMT-9 | T-045 | TVL-3440 |
| B | 40 | 150 | | | | | | | |
| C | ■40 | 150 | | | | | | | |

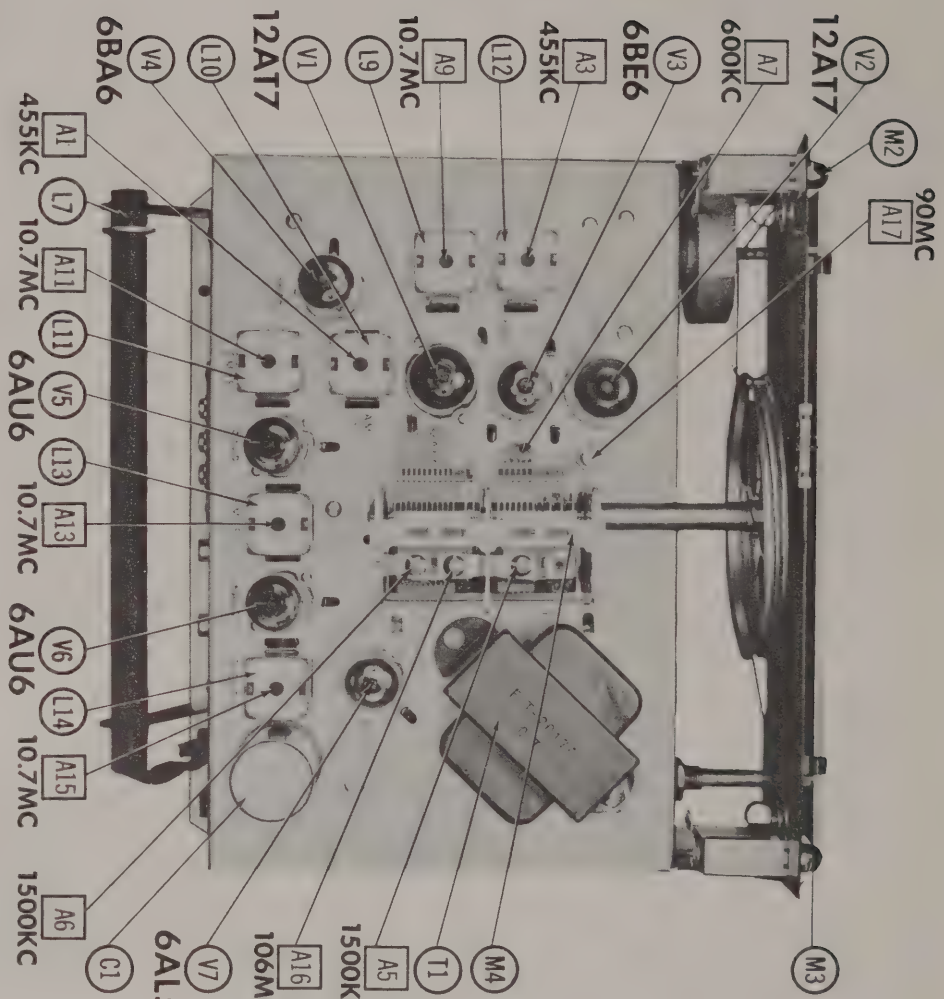
## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA Harman-Kardon PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C2 | 1000 | | | BPD-001 | DD-102 | K069 | 811-102 | DC-521 | 5HK-D1 | |
| C3 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C4 | 47 | | | BPD-000047 | DD-470 | G033 | 831-470 | UC-5447 | 5GA-Q47 | |
| C5 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C6 | 2.2 | | | NP0-SI2.2 | TCZ-2R2 | TZ05 | NP0A-2R2 | | 5TCCB-V22 | |
| C7 | 1-10 | | | | | | | | | |
| C8 | 4.7 | | | NP0-SI4.7 | TCZ-4R7 | Z010 | NP0A-4R7 | ZT-5547 | 5TCCB-V47 | Note 1 |
| C9 | 100 | | | N750-DI100 | TCN-100 | N042 | N750L-101 | NT-531 | 5TCU-T1 | |
| C10 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C11 | 10 | | | N750-DI10 | TCN-10 | N018 | N750A-100 | NT-541 | 5TCU-Q1 | |
| C12 | 10 | | | N750-DI10 | TCN-10 | N018 | N750A-100 | NT-541 | 5TCU-Q1 | |
| C13 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C14 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C15 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C16 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C17 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C18 | .05 | 200 | | BPD-05 | DF-503 | CUB2S5 | | PT415 | 2TM-S5 | |
| C19 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C20 | 47 | | | DI-000047 | DD-470 | G033 | 831-470 | UC-5447 | 5GA-Q47 | |
| C21 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C22 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C23 | 22 | | | DI-000022 | D6-220 | Z024 | 831-220 | UC-5422 | 5GA-Q22 | |
| C24 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C25 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C26 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | Note 1 |
| C27 | 270 | | | SI270 | D6-271 | TP41 | GP2K-271 | UC-5327 | 5GA-T27 | |
| C28 | 470 | | | SI470 | D6-471 | TP46 | GP2K-471 | UC-5347 | 5GA-T47 | |
| C29 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C30 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C31 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C32 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C33 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | Note 2 |
| C34 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C35 | 47 | | | BPD-000047 | DD-470 | G033 | 831-470 | UC-5447 | 5GA-Q47 | |
| C36 | 1000 | | | SI1000 | D6-102 | TP52 | GP2L-102 | UC-521 | 5GA-D1 | |
| C37 | .05 | 200 | | BPD-05 | DF-503 | CUB2S5 | | PT415 | 2TM-S5 | |
| C38 | 100 | | | SI100 | D6-101 | TP34 | GP1K-101 | UC-531 | 5GA-T1 | Note 1 |
| C39 | .05 | 600 | | BPD-05 | DF-503 | CUB6S5 | | PT615 | 6TM-S5 | Note 1 |
| C40 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | Note 1 |

Note 1. Not used in some versions.
Note 2. Some versions may use 47MMF in this application.

# CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | REPLACEMENT DATA Harman-Kardon PART No. | REPLACEMENT DATA IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R1 | 68Ω | | | BTS-68 | |
| R2 | 22K | | | BTS-22K | Note 1 |
| R3 | 1000Ω | | | BTS-1000 | |
| R4 | 100Ω | | | BTS-100 | |
| R5 | 470K | | | BTS-470K | |
| R6 | 560Ω | | | BTS-560 | |
| R7 | 1Meg | | | BTS-1Meg | |
| R8 | 3.3Meg | | | BTS-3.3Meg | |
| R9 | 1000Ω | | | BTS-1000 | |
| R10 | 1Meg | | | BTS-1Meg | |
| R11 | 22K | | | BTS-22K | |
| R12 | 1Meg | | | BTS-1Meg | |
| R13 | 1000Ω | | | BTS-1000 | |
| R14 | 47K | | | BTS-47K | |
| R15 | 470K | | | BTS-470K | |
| R16 | 1000Ω | | | BTS-1000 | |
| R17 | 100K | | | BTS-100K | |
| R18 | 15K | | | BTS-15K | |
| R19 | 15K | | | BTS-15K | |
| R20 | 100K | | | BTS-100K | |
| R21 | 100K | | | BTS-100K | |
| R22 | 68K | | | BTS-68K | |
| R23 | 330Ω | | | BTS-330 | |
| R24 | 330Ω | | | BTS-330 | |

Note 1. Some versions use 10K in this application.

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | RATING SEC. 3 | REPLACEMENT DATA Harman-Kardon PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC @.22A | 125VAC @.026A | 6.3VAC @2.45A | | FT20174 | P9102 ① | | PA8421 ① | | |

① Drill one new mounting hole.

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA Harman-Kardon PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | RF Choke | .8Ω | | | 19-1000 | | 4602 | 1 Microhenry, IRC part #CLA |
| L2 | RF Choke | 2.5Ω | | | | | | 3 Microhenries, IRC part #CLA |
| L3 | FM RF Coil | 0Ω | | | | | | Tapped |
| L4 | FM Osc. Coil | 0Ω | | | | | | |
| L5 | Cathode Choke | .8Ω | | | 19-1000 | | 4602 | 1 Microhenry, IRC part #CLA |
| L6 | RF Choke | 3Ω | | | | | | 3.3 Microhenries, IRC part #CLA - Note 1 |
| L7 | AM Loop Stick | .1Ω | .4Ω | GL471278 | | | | |
| L8 | AM Osc. Coil | 4.2Ω | | GL471251 | | | | Tapped @ .5Ω |
| L9 | 1st. FM IF | .6Ω | .6Ω | GT24605 | 16-3487 | FM-254 | 1463 | |
| L10 | 1st. AM IF | 16Ω | 16Ω | GT24610 | 16-6758 | BC-352 | 12-C1 | |
| L11 | 2nd. FM IF | .8Ω | .8Ω | GT24606 | 16-3487 | FM-254 | 1463 | |
| L12 | 2nd. AM IF | 16Ω | 16Ω | GT24610 | 16-6758 | BC-353 | 12-C1 | |
| L13 | 3rd. FM IF | .8Ω | .8Ω | GT24605 | 16-3487 | FM-254 | 1463 | |
| L14 | Discriminator | .8Ω | 10CT | GT24608 * | 17-3494 | FM-253 | 1464 | |

Note 1. Some versions may use 1 Microhenry in this application.
* Alternate part #GT-481423.

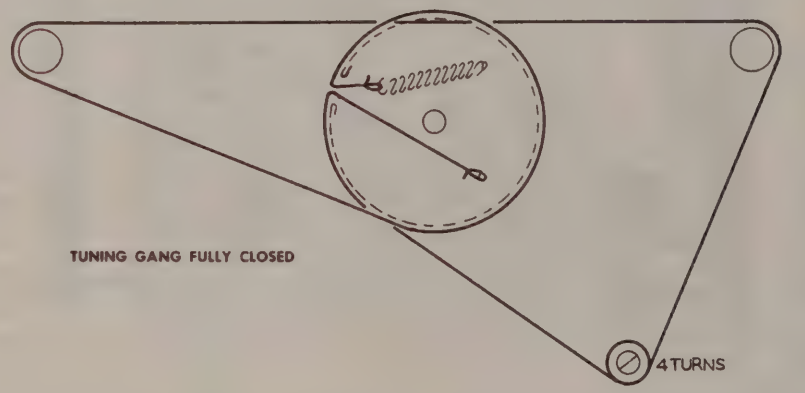
# PARTS LIST AND DESCRIPTIONS (Continued)

## SELENIUM RECTIFIER

| ITEM No. | RATING CURRENT | REPLACEMENT DATA Harman-Kardon PART No. | FEDERAL PART No. | INTERNATIONAL PART No. | MALLORY PART No. | RADIO RECEPTOR PART No. | SARKES TARZIAN PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| M1 | .026ADC | Z20690 | 1263A | RS065Q | 6865 | 8J1 | 65 | |

## MISCELLANEOUS

| ITEM No. | PART NAME | Harman-Kardon PART No. | NOTES |
|---|---|---|---|
| M2 | Dial Light | | #47 |
| M3 | Dial Light | | #47 |
| M4 | Tuning Cap. | JV471083 | 4 Gang (AM sections: 20-527MMF, 28-200MMF) |
| M5A | Switch | ER27748 | On-off (SPST) |
| B | Switch | | Function (DP- 4 position, Rotary, wafer type) |
| | Knob | P25790 | Control (2 used) |
| | Dial Glass | P27749 | |
| | Dial Pointer | Z24773 | |

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| TRADE NAME | HOFFMAN | MODELS | CHASSIS |
|---|---|---|---|
| | | B1011, K1011, M1011, B1031, M1031, P1031, W1031, B3001, M3001, P3001, W3001 | 316 |
| | | B1011-U, K1011-U, M1011-U, B1031-U, M1031-U, P1031-U, W1031-U, B3001-U, M3001-U, P3001-U, W3001-U | 316-U |
| | | B1011U-U2, K1011U-U2, M1011U-U2, B1031U-U2, M1031U-U2, P1031U-U2, W1031U-U2, B3001U-U2, M3001U-U2, P3001U-U2, W3001U-U2 | 316U-U2 |
| | | B1041, M1041, P1041, W1041, B3021, M3021, P3021, W3021, B3054, M3054, P3054, W3054 | 318 |
| | | B1041-U, M1041-U, P1041-U, W1041-U, B3021-U, M3021-U, P3021-U, W3021-U, B3054-U, M3054-U, P3054-U, W3054-U | 318-U |
| | | B1024, K1024, M1024 | 319 |
| | | B1024-U, K1024-U, M1024-U | 319-U |
| | | B1024U-U2, K1024U-U2, M1024U-U2 | 319U-U2 |

| | |
|---|---|
| MANUFACTURER | Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, California |
| TYPE SET | Television Receiver |
| TUBES | Twenty-one |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle RATING 1.76 Amp. @ 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) |

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RETMA MEMBER

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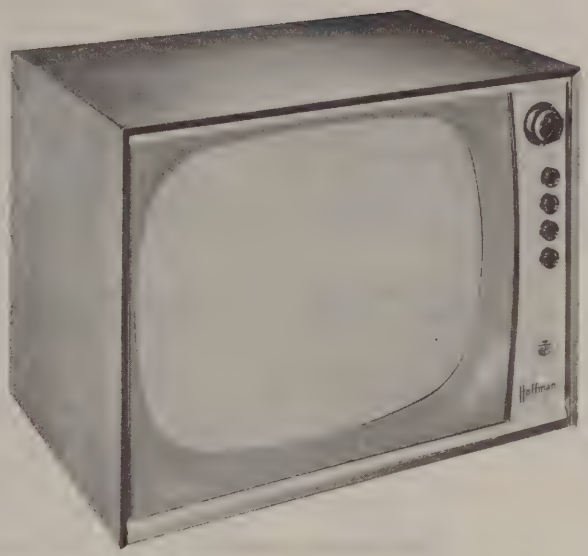
# HOFFMAN MODELS B1011, -U, B1024, -U, B1031, -U, B1041, -U, B3001, -U, B3021, -U, B3054, -U, K1011, -U, K1024, -U, M1011, -U, M1024, -U, M1031, -U, M1041, -U, M3001, -U, M3021, -U, M3054, -U, P1031, -U, P1041, -U, P3001, -U, P3021, -U, P3054, -U, W1031, -U, W1041, -U, W3001, -U, W3021, -U, W3054, -U (Ch. 316, -U, 318, -U, 319, -U)

## DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 8 metal screws. Remove rear cover.
3. Remove picture tube socket, H. V. lead, yoke plug and speaker leads.
4. Remove 2 chassis bolts and 2 metal screws holding rear chassis bracket. Remove chassis.
5. Remove 2 speaker nuts. Remove speaker.



| MODEL | CHASSIS |
|---|---|
| K1024-U | 319-U |

## SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the left of the Channel Selector Shaft.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 metal screws holding metal molding at top edge of the safety glass. Remove molding and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See Tube Placement Chart on Page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit may be made from the rear panel of the chassis. Adjust the horizontal frequency slug of L12 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L11) located on top of the chassis.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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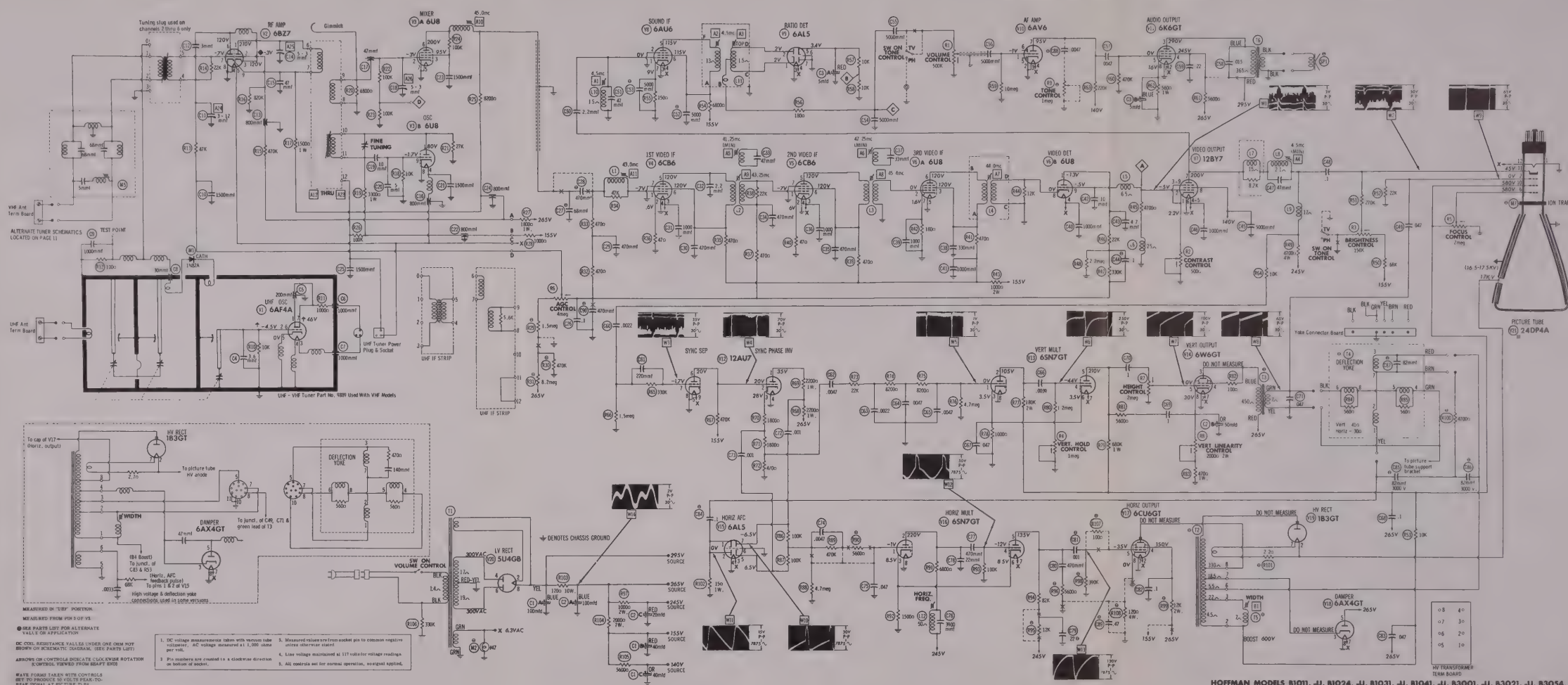
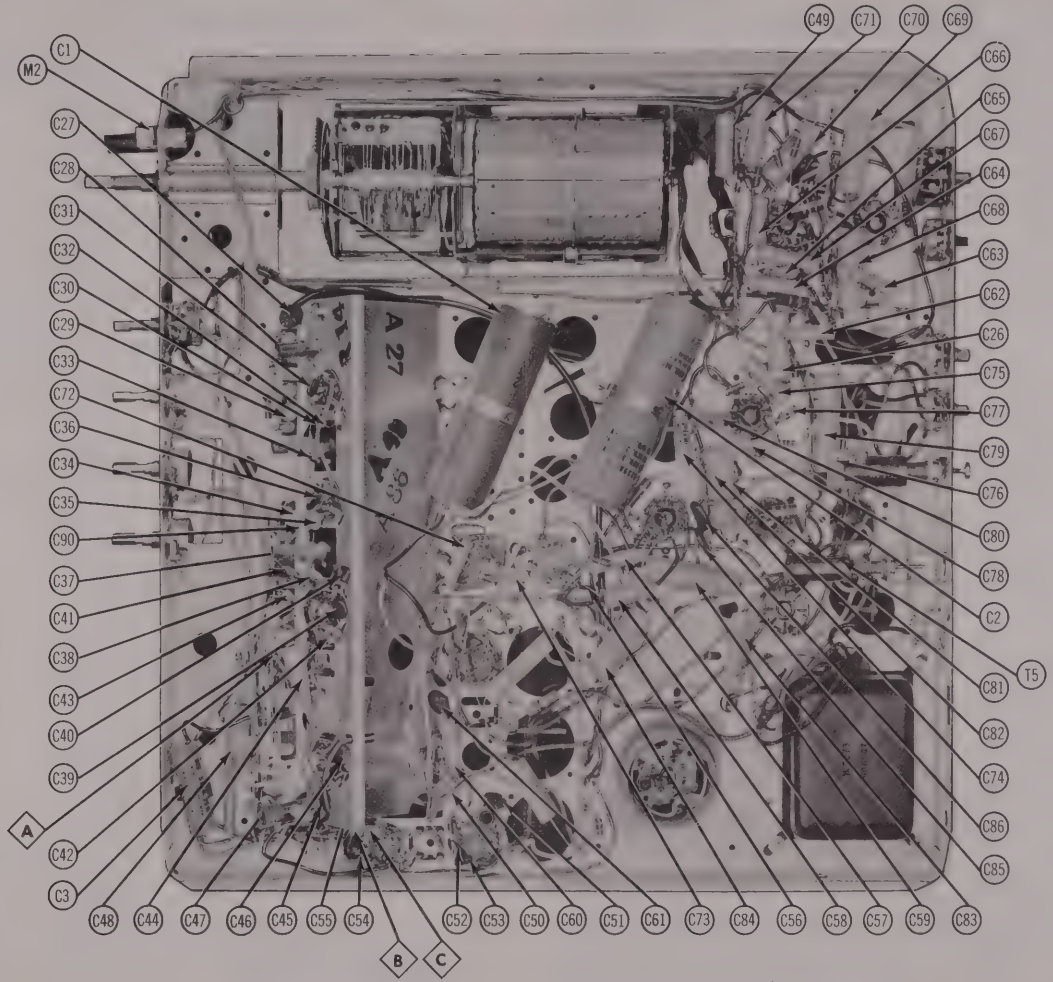
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1956 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under international Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

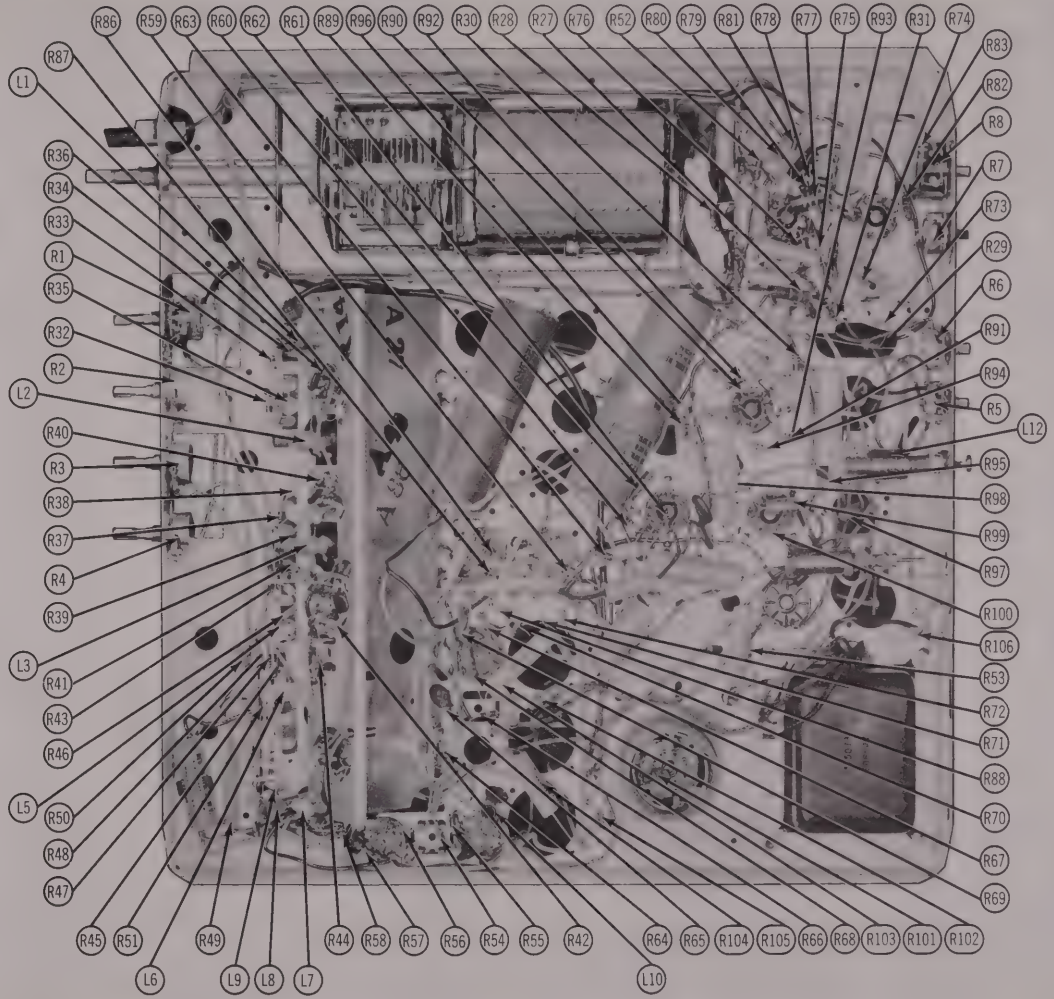



**HOFFMAN MODELS B1011, -U, B1024, -U, B1031, -U, B1041, -U, B3001, -U, B3021, -U, B3054, -U, K1011, -U, K1024, -U, M1011, -U, M1024, -U, M1031, -U, M1041, -U, M3001, -U, M3021, -U, M3054, -U, P1031, -U, P1041, -U, P3001, -U, P3021, -U, P3054, -U, W1031, -U, W1041, -U, W3001, -U, W3021, -U, W3054, -U (Ch. 316, -U, 318, -U, 319, -U)**

HOFFMAN MODELS B1011, -U, B1024, -U, B1031, -U, B1041, -U, B3001, -U, B3021, -U, B3054, -U, K1011, -U, K1024, -U, M1011, -U, M1024, -U, M1031, -U, M1041, -U, M3001, -U, M3021, -U, M3054, -U, P1031, -U, P1041, -U, P3001, -U, P3021, -U, P3054, -U, W1031, -U, W1041, -U, W3001, -U, W3021, -U, W3054, -U (Ch. 316, -U, 318, -U, 319, -U)

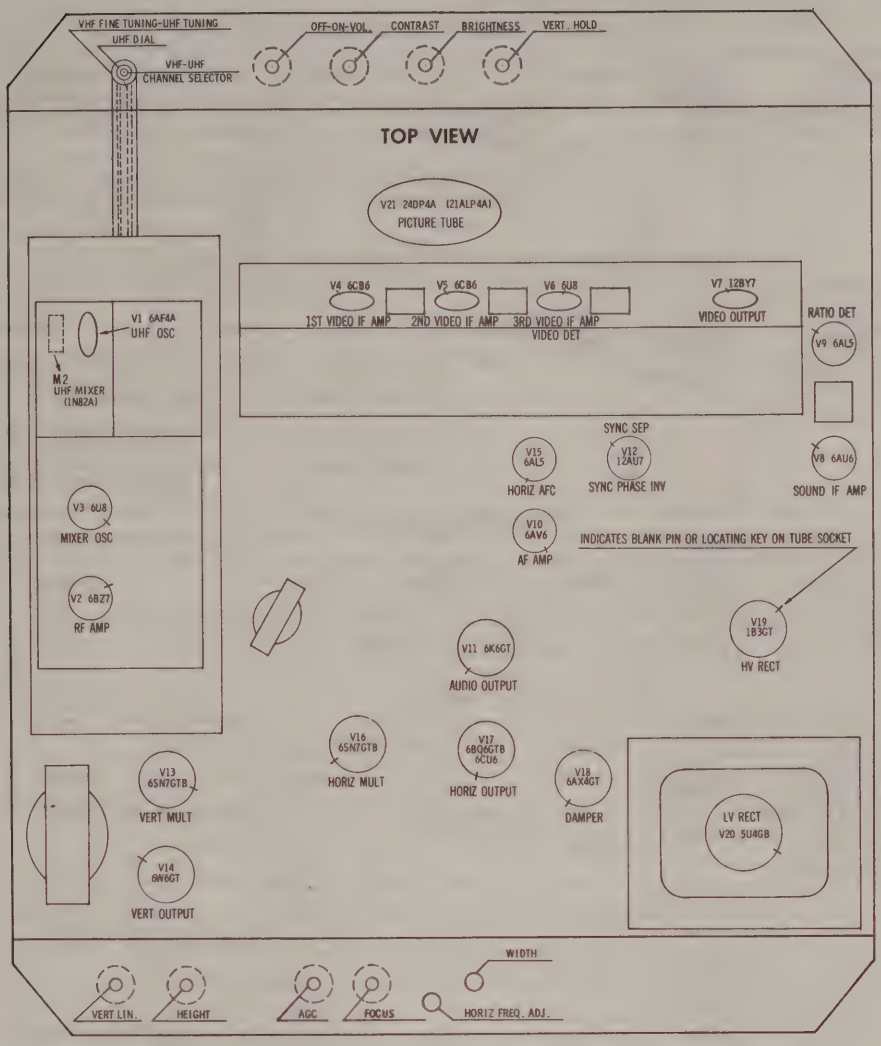



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

**POWER SUPPLY FAILURE**
No raster, no sound - V20

**LOSS OF PICTURE OR SOUND**
No pic, no sound, has raster - V3, V4, V5, V6, V7 (V1 UHF only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V7, V21
Has pic, no sound - V8, V9, V10, V11

**SYNC FAILURE**
No vert. sync - V12, V13
No horiz. sync - V12, V15, V16
No vert. or horiz. sync - V12

**SWEEP FAILURE**
No raster, has sound - V16, V17, V18, V19, V21
No vertical deflection - V13, V14
Poor vert. linearity or foldover - V13, V14
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17 , V18, V19, V20
Vert. off freq. - V12, V13
Horiz. off freq. - V12, V15, V16

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HOFFMAN MODELS B1011, -U, B1024, -U, B1031, -U, B1041, -U, B3001, -U, B3021, -U, B3054, -U, K1011, -U, K1024, -U, M1011, -U, M1024, -U, M1031, -U, M1041, -U, M3001, -U, M3021, -U, M3054, -U, P1031, -U, P1041, -U, P3001, -U, P3021, -U, P3054, -U, W1031, -U, W1041, -U, W3001, -U, W3021, -U, W3054, -U (Ch. 316, -U, 318, -U, 319, -U)

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

Switch the tuner between any two channels so that the detent roller sets on one of the high points of the drum disc. This will disable the local oscillator and reduce the possibility of erroneous indications.
Do not remove V16 to eliminate the high voltage shock hazard.

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .005MFD | High side to point Ⓐ. Low side to chassis. | 4.5MC (Unmod.) | Any | DC probe thru 10K to point Ⓑ. Common to chassis. | A1, A2 | Attenuate signal level to obtain 5 volts on VTVM. Adjust for maximum deflection. |
| 2. | " | " | " | " | DC probe to point Ⓒ. Common to chassis. | A3 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 1 and 2 until readings do not change. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .005MFD | High side to point Ⓐ. Low side to chassis. | 4.5MC (450KC Swp.) | 4.5MC | Any | Vert. amp. thru 10K to point Ⓑ. Low side to chassis. | A1, A2 | Disconnect stabilizing capacitor C3A. Adjust A1 and A2 for curve of maximum amplitude and symmetry similar to Fig. 1. |
| 2. | " | " | " | " | " | Vert. amp. thru 10K to point Ⓒ. Low side to chassis. | A3 | Reconnect stabilizing capacitor C3A. Adjust so that 4.5MC occurs at crossover lines as in Fig. 2. SLIGHTLY retouch A2 for maximum amplitude and straightness of crossover lines. |

## 4.5MC TRAP ALIGNMENT

Turn the contrast control fully clockwise.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 3. | .005MFD | High side to point Ⓐ. Low side to chassis. | 4.5MC (Unmod.) | Any | DC probe to pin 11 of picture tube thru detector (Fig. 3). Common to chassis. | A4 | Adjust for MINIMUM deflection. |

## VIDEO IF ALIGNMENT

Turn the contrast control fully clockwise. Connect the negative lead of a 3 volt battery to the ungrounded side of C43. Connect the positive lead to chassis. Attenuate generator output as low as possible to obtain readings.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 4. | Direct | High side to ungrounded tube shield floating over converter tube (V3). Low side to chassis. | 41.25MC (Unmod.) | Between any two channels | DC probe to point Ⓐ. Common to chassis. | A5 | Adjust for MINIMUM deflection. |
| 5. | " | " | 47.25MC | " | " | A6 | " |
| 6. | " | " | 44.0MC | " | " | A7 | Adjust for maximum deflection. |
| 7. | " | " | 45.4MC | " | " | A8 | " |
| 8. | " | " | 43.25MC | " | " | A9 | " |
| 9. | " | " | 43.0MC | " | " | A10 | Adjust A10 for MINIMUM deflection. |
| 10. | " | " | 43.0MC | " | " | A11 | Adjust for maximum deflection. |
| 11. | " | " | 45.0MC | " | " | A10 | Readjust A10 for maximum deflection. Repeat steps 4 thru 11 until readings do not change. |

## OVERALL VIDEO IF RESPONSE CHECK

Connect a .001MFD capacitor across the vertical input terminal on scope. Connect bias as under "Video IF Alignment." Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 12. | Direct | High side to ungrounded tube shield floating over converter tube. Low side to chassis. | 43.5MC (10MC Swp.) | 41.25MC 42.5MC 45.75MC 47.25MC | Set channel selector between any two channels | Vert. amp. thru 10K to point Ⓐ.. Low side to chassis. | | Check for response curve similar to Fig. 4. Use high scope gain and sweep generator output. Remove bias battery to view trap markers. If necessary, retouch A7 thru A11 for desired response. Bandpass should be approximately 3.25MC. Adjust A8 to place 45.75MC at 50% on response curve. Adjust A9 to place 42.5MC at 50% on low frequency side of response curve. Adjust A7 to eliminate tilt on response curve. If necessary, SLIGHTLY retouch A5 and A6 to place 41.25MC and 45.75MC markers in trap notch as in Fig. 4. |

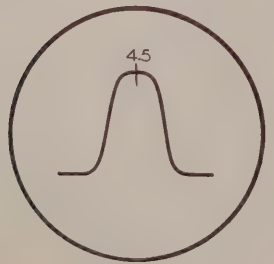

FIG. 1

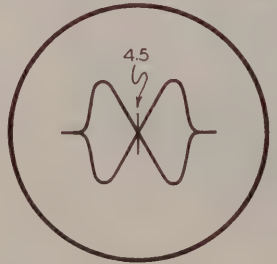

FIG. 2

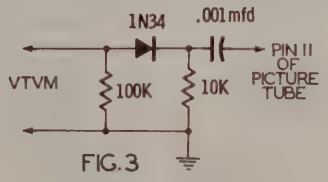

FIG. 3

# ALIGNMENT INSTRUCTIONS (cont)

## VHF OSCILLATOR ALIGNMENT

Leave bias connected as under "Video IF Alignment."
The channel oscillator adjustment screws are reached through a hole just to the left of the channel selector switch shaft.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 13 | Two 120Ω Carbon Resistors | Across VHF antenna terminals with 120Ω in each lead. | 213MC (10MC Swp.) | 211. 25MC 215. 75MC | 13 | Vert. amp. thru 10K to point Ⓐ. Low side to chassis. | A12 | Adjust to place sound marker in trap notch as shown in Fig. 5. Video marker should be at 50%. |
| | | | 207MC (10MC Swp.) | 205. 25MC 209. 75MC | 12 | | A13 | |
| | | | 201MC (10MC Swp.) | 199. 25MC 203. 75MC | 11 | | A14 | |
| | | | 195MC (10MC Swp.) | 193. 25MC 197. 75MC | 10 | | A15 | |
| | | | 189MC (10MC Swp.) | 187. 25MC 191. 75MC | 9 | | A16 | |
| | | | 183MC (10MC Swp.) | 181. 25MC 185. 75MC | 8 | | A17 | |
| | | | 177MC (10MC Swp.) | 175. 25MC 179. 75MC | 7 | | A18 | |
| | | | 85MC (10MC Swp.) | 83. 25MC 87. 75MC | 6 | | A19 | |
| | | | 79MC (10MC Swp.) | 77. 25MC 81. 75MC | 5 | | A20 | |
| | | | 69MC (10MC Swp.) | 67. 25MC 71. 75MC | 4 | | A21 | |
| | | | 63MC (10MC Swp.) | 61. 25MC 65. 75MC | 3 | | A22 | |
| | | | 57MC (10MC Swp.) | 55. 25MC 59. 75MC | 2 | | A23 | |

## VHF RF AND MIXER ALIGNMENT

Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 14 | Two 120Ω Carbon Resistors | Across VHF antenna terminals with 120Ω in each lead. | 207MC (10MC Swp.) | 205. 25MC 209. 75MC | 12 | Vert. amp. thru 10K to point Ⓓ. Low side to chassis. | A24, A25, A26 | Adjust for response curve similar to Fig. 6 with markers above 90%. |
| 15 | " | " | 213MC (10MC Swp.) | 211. 25MC 215. 75MC | 13 | " | | If markers fall below 70% on any one channel, make compromise adjustments of A24, A25, and A26 with channel selector set to that channel. Check all other channels to see that they have not been seriously affected. |
| | | | 201MC (10MC Swp.) | 199. 25MC 203. 75MC | 11 | | | |
| | | | 195MC (10MC Swp.) | 193. 25MC 197. 75MC | 10 | | | |
| | | | 189MC (10MC Swp.) | 187. 25MC 191. 75MC | 9 | | | |
| | | | 183MC (10MC Swp.) | 181. 25MC 185. 75MC | 8 | | | |
| | | | 177MC (10MC Swp.) | 175. 25MC 179. 75MC | 7 | | | |
| | | | 85MC (10MC Swp. | 83. 25MC 87. 75MC | 6 | | | |
| | | | 79MC (10MC Swp.) | 77. 25MC 81. 75MC | 5 | | | |
| | | | 69MC (10MC Swp.) | 67. 25MC 71. 75MC | 4 | | | |
| | | | 63MC (10MC Swp.) | 61. 25MC 65. 75MC | 3 | | | |
| | | | 57MC (10MC Swp.) | 55. 25MC 59. 75MC | 2 | | | |

## 43.5MC TRAP ALIGNMENT

Adjust the 43.5MC trap adjustment A27 for MINIMUM interference on channel 2.

## UHF TUNER ALIGNMENT

The UHF portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

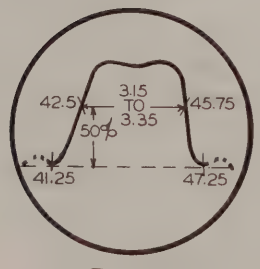


FIG.4

FIG.5

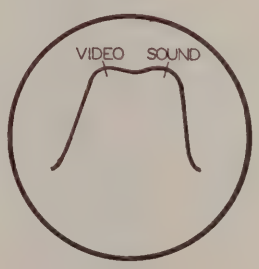


FIG.6

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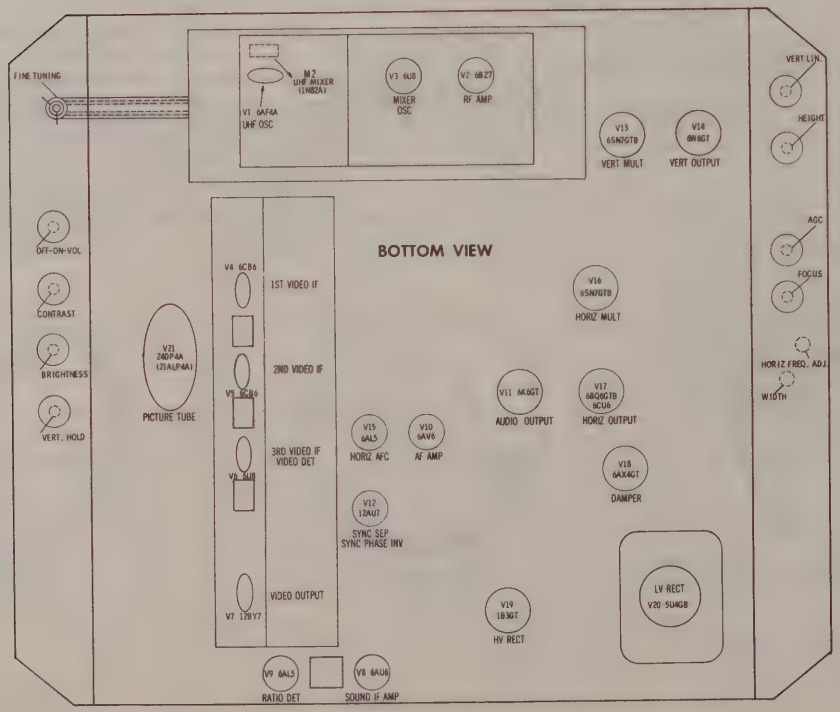
L. F. HOFFMAN RADIO SHOP
DENVER, COLORADO

HOFFMAN MODELS B1011, -U, B1024, -U, B1031, -U, B1041, -U, B3001, -U, B3021, -U, B3054, -U, K1011, -U, K1024, -U, M1011, -U, M1024, -U, M1031, -U, M1041, -U, M3001, -U, M3021, -U, M3054, -U, P1031, -U, P1041, -U, P3001, -U, P3021, -U, P3054, -U, W1031, -U, W1041, -U, W3001, -U, W3021, -U, W3054, -U (Ch. 316, -U, 318, -U, 319, -U)

# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6AF4A | *† 7K | 10K | .1Ω | 0Ω | 0Ω | 10K | *† 7K | | |
| V2 | 6BZ7 | † 3.4K | 300K | INF | 0Ω | .1Ω | INF | 1.7Meg | 0Ω | † 3.4K |
| V3 | 6U8 | † 5.5K | 200K | † 100K | .1Ω | 0Ω | † 10K | 0Ω | 0Ω | 10K |
| V4 | 6CB6 | 1.5Meg | 47Ω | .1Ω | 0Ω | † 3.5K | † 3.5K | 0Ω | | |
| V5 | 6CB6 | 1.5Meg | 47Ω | .1Ω | 0Ω | † 3.5K | † 3.5K | 0Ω | | |
| V6 | 6U8 | 1.5Meg | .1Ω | † 3.5K | .1Ω | 0Ω | † 3.5K | 180Ω | .1Ω | 4.7K |
| V7 | 12BY7 | 160Ω | 4.7K | 160Ω | .1Ω | .1Ω | 0Ω | † 5.5K | † 7.5K | 160Ω |
| V8 | 6AU6 | 1.5Ω | 0Ω | 0Ω | .1Ω | † 9K | † 9K | 150Ω | | |
| V9 | 6AL5 | INF | INF | 0Ω | .1Ω | 20K | 0Ω | 0Ω | | |
| V10 | 6AV6 | 10Meg | 0Ω | 0Ω | .1Ω | NC | NC | † 220K | | |
| V11 | 6K6GT | NC | .1Ω | † 365Ω | † 5.7K | 470K | TP | 0Ω | 560Ω | |
| V12 | 12AU7 | † 4.5K | † 470K | 4K | 0Ω | 0Ω | † 470K | 1.8Meg | 0Ω | .1Ω |
| V13 | 6SN7GT | 4.7Meg | ¶ 180K | 1K | 1.3Meg | ¶ 680K | 1K | .1Ω | 0Ω | |
| V14 | 6W6GT | NC | 0Ω | † 600Ω | † 700Ω | 1.3Meg | NC | .1Ω | 1K | |
| V15 | 6AL5 | 15Ω | 15Ω | .1Ω | 0Ω | 4.8Meg | 0Ω | 4.8Meg | | |
| V16 | 6SN7GT | 5Meg | † 8K | 1.5K | 100K | † 95K | 1.5K | .1Ω | 0Ω | |
| V17 | 6CU6GT | NC | .1Ω | NC | † 12K | 390K | NC | 0Ω | 0Ω | TOP CAP ¶ 18.5Ω |
| V18 | 6AX4GT | NC | NC | 2Meg | TP | † 120Ω | NC | .1Ω | 0Ω | |
| V19 | 1B3GT | | PINS | 1-8 | HAVE | INF | RESISTANCE | | | TOP CAP ¶ 350Ω |
| V20 | 5U4GB | INF | 25K | INF | 17Ω | INF | 19Ω | INF | 25K | |
| V21 | 24DP4A | 0Ω | 22K | PIN 6 ¶ 10K | PIN 10 ¶ 10K | PIN 11 † 300K | PIN 12 .1Ω | | | |

* MEASURED IN "UHF" POSITION.
† MEASURED FROM PIN 8 OF V20.
¶ MEASURED FROM PIN 3 OF V18.
TP-TIE POINT.
NC-NO CONNECTION.

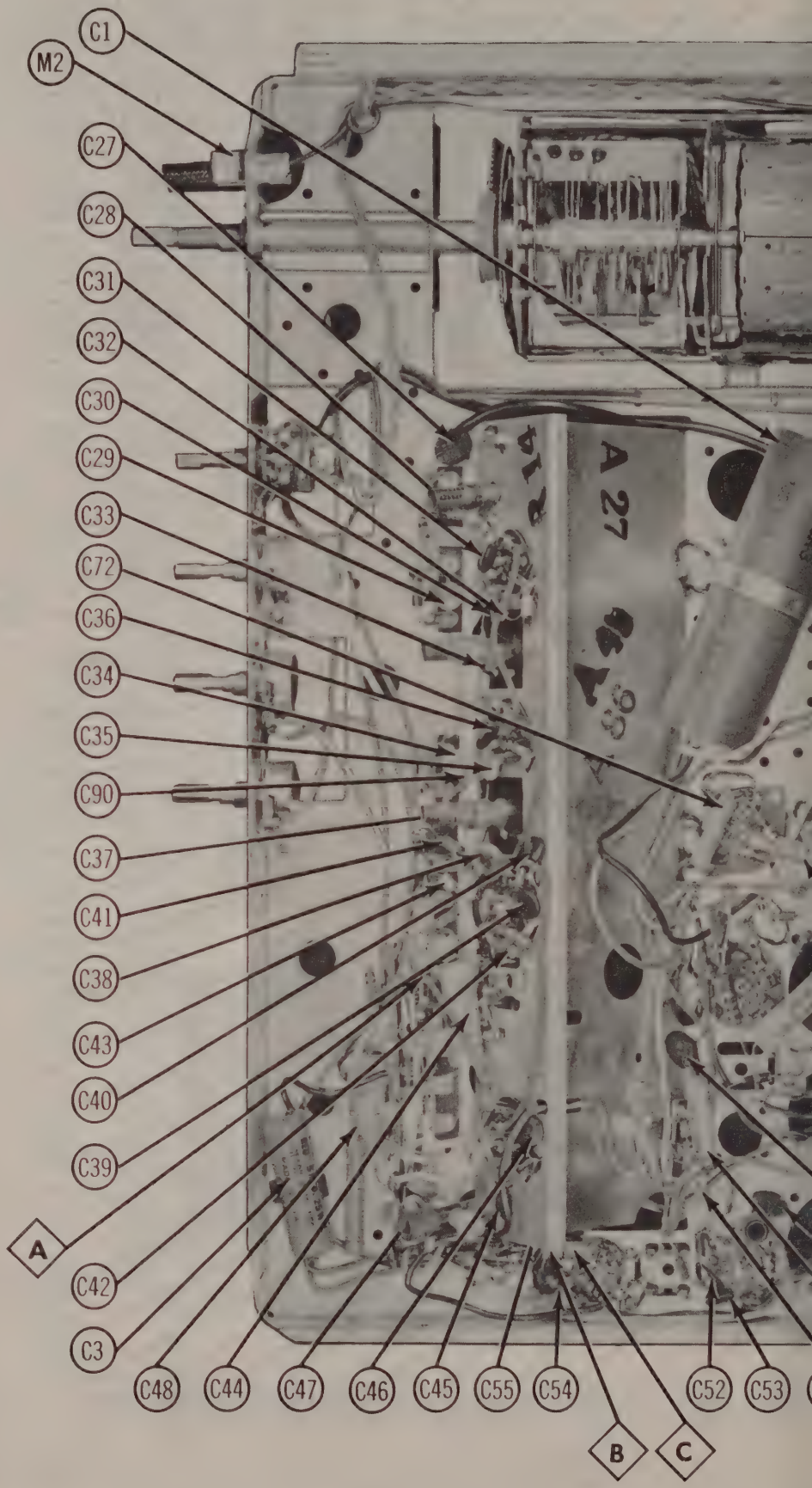



# TUBE PLACEMENT CHART

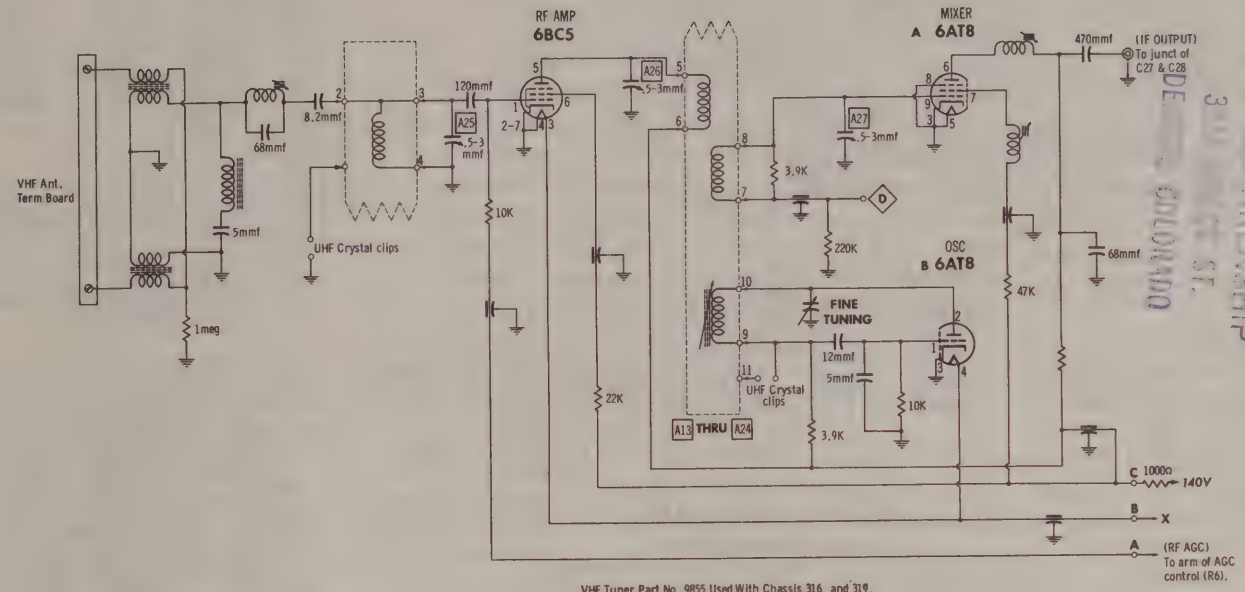
PROPERTY OF
L. F. HUMMENSHIP
[illegible] ST.
[illegible], COLORADO

HOFFMAN MODELS B1011, -U, B1024, -U, B1031, -U, B1041, -U, B3001, -U, B3021, -U, B3054, -U, K1011, -U, K1024, -U, M1011, -U, M1024, -U, M1031, -U, M1041, -U, M3001, -U, M3021, -U, M3054, -U, P1031, -U, P1041, -U, P3001, -U, P3021, -U, P3054, -U, W1031, -U, W1041, -U, W3001, -U, W3021, -U, W3054, -U (Ch. 316, -U, 318, -U, 319, -U)

## AND INDUCTOR IDENTIFICATION




CHASSIS BOTTOM VIEW-CAPACIT




A PHOTOFACT STANDARD NOTATION SCHEMATIC
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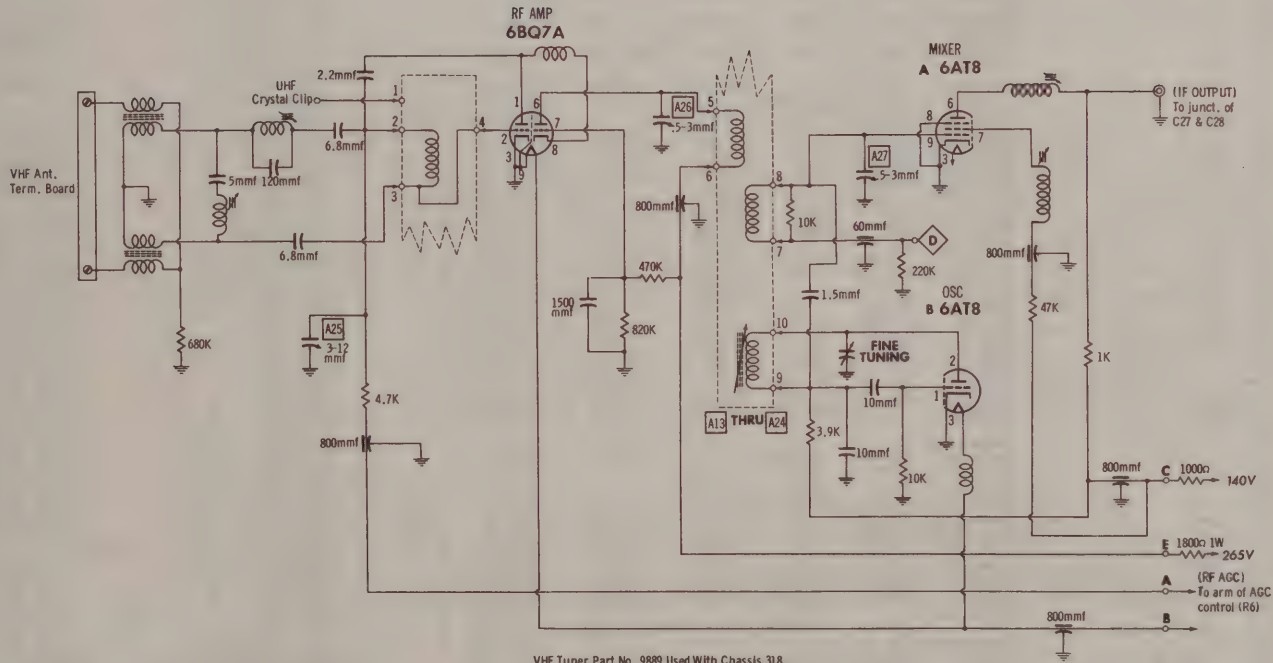
VHF Tuner Part No. 9855 Used With Chassis 316, and 319.

## ALTERNATE TUNER SCHEMATIC

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VHF Tuner Part No. 9889 Used With Chassis 318.

## ALTERNATE TUNER SCHEMATIC

HOFFMAN MODELS B1011, -U, B1024, -U, B1031, -U, B1041, -U, B3001, -U, B3021, -U, B3054, -U, K1011, -U, K1024, -U, M1011, -U, M1024, -U, M1031, -U, M1041, -U, M3001, -U, M3021, -U, M3054, -U, P1031, -U, P1041, -U, P3001, -U, P3021, -U, P3054, -U, W1031, -U, W1041, -U, W3001, -U, W3021, -U, W3054, -U (Ch. 316, -U, 318, -U, 319, -U)

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | UHF Osc. | 6AF4A | |
| V2 | RF Amp. | 6BZ7 | |
| V3 | Mixer-Osc. | 6U8 | |
| V4 | 1st Video IF Amp. | 6CB6 | |
| V5 | 2nd Video IF Amp. | 6CB6 | |
| V6 | 3rd Video IF Amp. - Video Det. | 6U8 | |
| V7 | Video Output | 12BY7 | |
| V8 | Sound IF Amp. | 6AU6 | |
| V9 | Ratio Det. | 6AL5 | |
| V10 | AF Amp. | 6AV6 | |
| V11 | Audio Output | 6K6GT | |
| V12 | Sync-Sep.-Sync Phase Inv. | 12AU7 | |
| V13 | Vert. Mult. | 6SN7GT | |
| V14 | Vert. Output | 6W6GT | |
| V15 | Horiz. AFC | 6AL5 | |
| V16 | Horiz. Mult. | 6SN7GT | |
| V17 | Horiz. Output | 6CU6GT | |
| V18 | Damper | 6AX4GT | |
| V19 | HV Rectifier | 1B3GT | |
| V20 | LV Rectifier | 5U4GB | |

## PICTURE TUBE

| ITEM No. | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|
| | HOFFMAN PART No. | CBS PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V21 | 24DP4A ② | 24DP4A ①<br>24CP4A ① | 24DP4A ① | 24DP4A ② | ① Aluminized<br>② Silver Screen "85" |
| | | | | 24DP4 | |
| | | 21ALP4 | 21ALP4 | | |
| | 21ALP4A ② | 21ALP4A ① | 21ALP4A ① | | |
| | | | 21ALP4A/B ① | 21ALP4A/B ② | |
| | | 21ALP4B ① | | | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | HOFFMAN PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | 100 | 350 | 4235A | E59B341A | | WT455 | | Q-012 | R2169 * |
| B | 40 | 300 | | | | | | MT-4520 | |
| C | 40 | 250 | | | | | | | |
| C2A | 100 | 350 | 4239 | PR3-053 | | WT455 | | T-110 | R2168 * |
| B | 50 | 50 | | | | | | MT-0550 | |
| C | 20 | 350 | | | | | | | |
| C3A | 5 | 25 | 4233A | E58C114 | BR550 | TC30 | TD-5-25 | MMT-0505 | TVA-1203 |
| B | 5 | 50 | | | BR550 | TC30 | TD-5-50 | MMT-0505 | TVA-1303 |

* Non-catalog item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | HOFFMAN PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C4 | 3.6 | | | | | | | | | |
| C5 | 200 | | | | | | | | | |
| C6 | 1000 | | | | | | | | | |
| C7 | 1000 | | | | | | | | | |
| C8 | 30 | | | | | | | | | |
| C9 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C10 | 1500 | | | BPD-0015 | DD-152 | K071 | 801-0015 | DC-5215 | 5HK-D15 | |
| C11 | 3-12 | | | | | | | | | |
| C12 | 3 | | | NPO-D13 | TCZ-3R3 | Z007 | NPOA-030 | ZT-553 | 5TCCB-V33 | |
| C13 | 800 | | | | | | | | | |
| C14 | .5-3 | | | | 829-3 | | 3115-01-0R5 | CT565A | | |
| C15 | 47 | | | | | | | | | |
| C16 | 800 | | | | | | | | | |
| C17 | 47 | | | | MFT-50 | | | | | |
| C18 | .5-3 | | | | 829-3 | | 3115-01-0R5 | CT565A | | |
| C19 | 10 | | | N750-D110 | TCN-10 | N018 | N750K-100 | NT-541 | 5TCU-Q1 | |
| C20 | 5 | | | | | | | | | |
| C21 | 1500 | | | BPD-0015 | DD-152 | K071 | 801-0015 | DC-5215 | 5HK-D15 | |
| C22 | 800 | | | | | | | | | |
| C23 | 1500 | | | BPD-0015 | DD-152 | K071 | 801-0015 | DC-5215 | 5HK-D15 | |
| C24 | 800 | | | | | | | | | |
| C25 | 1500 | | | BPD-0015 | DD-152 | K071 | 801-0015 | DC-5215 | 5HK-D15 | |
| C26 | .1 | 200 | | P288N-1 | DF-104 | CUB2P1 | | PT401 | 2TM-P1 | |
| C27 | 68 | | | NPO-D168 | TCZ-68 | Z038 | NPO-337-680 | | 5TCC-Q68 | Note 8 |
| C28 | 470 | | | BPD-00047 | DD-471 | K069 | 831-471 | UC-5347 | 5GA-T47 | Note 8 |
| C29 | 470 | | | BPD-00047 | DD-471 | K060 | 831-471 | UC-5347 | 5GA-T47 | |
| C30 | 470 | | | BPD-00047 | DD-471 | K060 | 831-471 | UC-5347 | 5GA-T47 | |
| C31 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C32 | 2.2 | | | NPO-SI2.2 | TCZ-2R2 | TZ05 | NPOA-2R2 | | 5TCCB-V22 | |
| C33 | 47 | | | NPO-D147 | TCZ-47 | Z033 | NPO-338-470 | ZT-5447 | 5TCC-Q47 | |
| C34 | 470 | | | BPD-00047 | DD-471 | K060 | 831-471 | UC-5347 | 5GA-T47 | |
| C35 | 470 | | | BPD-00047 | DD-471 | K060 | 831-471 | UC-5347 | 5GA-T47 | |
| C36 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C37 | 33 | | | NPO-D133 | TCZ-33 | Z029 | NPOL-330 | ZT-5433 | 5TCC-Q33 | |
| C38 | 330 | | | BPD-00033 | DD-331 | | 811-331 | UC-5333 | 5GA-T33 | |
| C39 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C40 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C41 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C42 | 10 | | | SI10 | D6-100 | TP09 | GP1K-100 | UC-541 | 5GA-Q1 | |
| C43 | 4.7 | | | NPO-SI4.7 | TCZ-4R7 | TZ07 | NPOA-4R7 | ZT-5547 | 5TCCB-V47 | |
| C44 | .1 | 200 | | P288N-1 | DF-104 | CUB2P1 | | PT401 | 2TM-P1 | Note 1 |
| C45 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C46 | 1000 | | | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C47 | 47 | | | | | | | | | |
| C48 | .1 | 400 | | P488N-1 | DF-104 | CUB4P1 | | PT401 | 4TM-P1 | |
| C49 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C50 | 2.2 | | | NPO-SI2.2 | TCZ-2R2 | TZ05 | NPOA-2R2 | | 5TCCB-V22 | |
| C51 | 47 | | | | | | | | | |
| C52 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | Note 2 |
| C53 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | Note 2 |
| C54 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C55 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C56 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C57 | .0047 | 200 | | SI4700 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C58 | .015 | 400 | | BPD-015 | DD16-153 | CUB6S15 | 817-015 | PT6115 | 6TM-S15 | |
| C59 | .22 | 400 | | P488N-22 | | CUB4P22 | | PT4022 | 4TM-P22 | |
| C60 | .0022 | 200 | | SI2200 | D6-222 | CUB6D22 | GP2-333-222 | PT6222 | 6TM-D22 | |
| C61 | 220 | | | BPD-00022 | DD-221 | G051 | 811-221 | UC-5322 | 5GA-T22 | |
| C62 | .0047 | 200 | | SI4700 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C63 | .0022 | 200 | | SI2200 | D6-222 | CUB6D22 | GP2-333-222 | PT6222 | 6TM-D22 | |
| C64 | .0047 | 200 | | SI4700 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C65 | .0047 | 200 | | SI4700 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C66 | .0039 | 400 | | 1464-0039 | | 1R5D39 | | MCB463 | MS-239 | |
| C67 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C68 | .1 | 600 | | P688N-1 | DF-104 | CUB6P1 | | PT601 | 6TM-P1 | |
| C69 | .1 | 600 | | P688N-1 | DF-104 | CUB6P1 | | PT601 | 6TM-P1 | |
| C70 | .1 | 400 | | P488N-1 | DF-104 | CUB4P1 | | PT401 | 4TM-P1 | |
| C71 | .047 | 400 | | BPD-05 | BPD-05 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C72 | .001 | 200 | | SI1000 | D6-102 | CUB6D1 | GP2L-102 | PT621 | 6TM-D1 | |
| C73 | .001 | 200 | | SI1000 | D6-102 | CUB6D1 | GP2L-102 | PT621 | 6TM-D1 | |

## PARTS LIST AN CAPAC

| ITEM No. | RATING | | HOFFMAN PART No. | AEROVOX PART No. | CENTRA PART N |
|---|---|---|---|---|---|
| | CAP. | VOLT | | | |
| C74 | .0047 | 200 | | SI4700 | D6-472 |
| C75 | .047 | 200 | | BPD-05 | DF-503 |
| C76 | 3900 | 500 | | 1464-0039 | |
| C77 | 470 | 500 | | 1469-00047 | D6-471 |
| C78 | 22 | | | SI22 | D6-220 |
| C79 | .22 | 400 | | P488N-222 | |
| C80 | 470 | 500 | | 1469-00047 | D6-471 |
| C81 | .001 | 400 | | SI1000 | D6-102 |
| C82 | .1 | 400 | | P488N-1 | DF-104 |
| C83 | .047 | 600 | | BPD-05 | BPD-05 |
| C84 | .1 | 600 | | P688N-1 | DF-104 |
| C85 | 82 | 3000 | | | DD30-8 |
| C86 | 82 | 3000 | | | DD30-8 |
| C87 | 82 | | | | DD30-8 |
| C88 | .0047 | | | | |
| C89 | .47 | | | | |
| C90 | 470 | | | BPD-00047 | DD-471 |

Note 1. Some versions may use .01MFD in this application.
Note 2. In some versions C52 and C53 are combined in a du
Note 3. Not used in Chassis 318.
Note 4. Chassis 318 uses 5000MMF in this application.
Note 5. Used only in Chassis 318.
Note 6. Chassis 318 may use 140MMF in this application.
Note 7. Not used in some versions.
Note 8. Not used when tuner 9855 is used.

## CON

| ITEM No. | RATING | | REPLACEMEN | | |
|---|---|---|---|---|---|
| | RESIST-ANCE | WATTS | HOFFMAN PART No. | CENTRALAB PART No. | CLARO PART |
| R1A | 500KΩ | ½ | H4880A | AB-60 | A47-500 |
| B | Shaft | | Not Req. | AK-4 | KSS-3 |
| C | Switch | | Not Req. | KB-1 | SWE-12 |
| R2A | 500Ω | ½ | H4878A | AB-4 | A47-500 |
| B | Shaft | | Not Req. | AK-4 | KSS-3 |
| R3A | 150KΩ | ½ | H4879A | AB-43 | A47-150K |
| B | Shaft | | Not Req. | AK-4 | KSS-3 |
| R4A | 1Meg | ½ | H4877A | AB-69 | A47-1Me |
| B | Shaft | | Not Req. | AK-4 | KSS-3 |
| R5A | 2Meg | ½ | H4965-2 | BX-75 | A47-2Me |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 |
| R6A | 4Meg | ½ | H4970-2 | AB-86 | A47-4Me |
| B | Shaft | | Not Req. | AK-1 | RN-3 |
| R7A | 2Meg | ½ | H4965 | BX-75 | A47-2Me |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 |
| R8A | 2000Ω | 2 | H4827A | VK-131 | A43-200 |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 |
| R9 | 1Meg | ½ | 4856A | | |

Note 1. Used in chassis 318 only.

## RESIS

All wattages 1/2 watt, or les

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | HOFFMAN PART No. | IRC PART No. | |
| R10 | 10KΩ | | | | |
| R11 | 1000Ω | | | BTS-1000 | |
| R12 | 100Ω | | | | |
| R13 | 47KΩ | | | BTS-47K | |
| R14 | 22KΩ | | | BTS-22K | |
| R15 | 470KΩ | | | BTS-470K | |
| R16 | 820KΩ | | | BTS-820K | |
| R17 | 1500Ω | 1 | | BTA-1500 | |
| R18 | 10KΩ | | | | |
| R19 | 3300Ω | 1 | | BTA-3300 | |
| R20 | 6800Ω | | | | |
| R21 | 27KΩ | | | | |
| R22 | 100KΩ | | | BTS-100K | |
| R23 | 100KΩ | | | BTS-100K | |
| R24 | 100KΩ | | | BTS-100K | |
| R25 | 8200Ω | | | BTS-8200 | |
| R26 | 100KΩ | | | BTS-100K | |
| R27 | 1800Ω | 1 | | BTA-1800 | |
| R28 | 1000Ω | | | BTS-1000 | |
| R29 | 1.5Meg | | | BTS-1.5Meg | Note 1 |
| R30 | 470KΩ | | | BTS-470K | Note 8 |
| R31 | 8.2Meg | | | BTS-8.2Meg | Note 8 |
| R32 | 470Ω | | | BTS-470 | |
| R33 | 470Ω | | | BTS-470 | |
| R34 | 47KΩ | | | BTS-47K | |
| R35 | 470Ω | | | BTS-470 | |
| R36 | 47Ω | | | BTS-47 | |
| R37 | 470Ω | | | BTS-470 | |
| R38 | 22KΩ | | | BTS-22K | |
| R39 | 470Ω | | | BTS-470 | |
| R40 | 47Ω | | | BTS-47 | |
| R41 | 470Ω | | | BTS-470 | |
| R42 | 180Ω | | | BTS-180 | |
| R43 | 1000Ω | 2 | | BTB-1000 | |
| R44 | 12KΩ | | | BTS-12K | |
| R45 | 4700Ω | | | BTS-4700 | |
| R46 | 22KΩ | | | BTS-22K | |
| R47 | 330KΩ | | | BTS-330K | |
| R48 | 2.2Meg | | | BTS-2.2Meg | |
| R49 | 4700Ω | 4 | H-44612 | | |
| R50 | 68KΩ | | | BTS-68K | |
| R51 | 270KΩ | | | BTS-270K | |
| R52 | 22KΩ | | | BTS-22K | |
| R53 | 10KΩ | | | BTS-10K | |
| R54 | 6800Ω | | | BTS-6800 | |
| R55 | 150Ω | | | BTS-150 | |
| R56 | 180Ω | | | BTS-180 | |
| R57 | 10KΩ | | | BTS-10K | |
| R58 | 10KΩ | | | BTS-10K | |
| R59 | 10Meg | | | BTS-10Meg | |

Note 1. Some versions use a 330KΩ ½W
Note 2. Chassis 318 uses a 470Ω ½W re
Note 3. In Chassis 318 a 12KΩ ½W resi
Note 4. In Chassis 318 a 330KΩ ½W re
Note 5. In Chassis 318 a 4700Ω 2W re
Note 6. In Chassis 318 a 2.7Ω ½W (WW
Note 7. Not used in Chassis 318.
Note 8. Not used in some versions.
Note 9. Used in Chassis 318.

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | UHF Osc. | 6AF4A | |
| V2 | RF Amp. | 6BZ7 | |
| V3 | Mixer-Osc. | 6U8 | |
| V4 | 1st Video IF Amp. | 6CB6 | |
| V5 | 2nd Video IF Amp. | 6CB6 | |
| V6 | 3rd Video IF Amp. - Video Det. | 6U8 | |
| V7 | Video Output | 12BY7 | |
| V8 | Sound IF Amp. | 6AU6 | |
| V9 | Ratio Det. | 6AL5 | |
| V10 | AF Amp. | 6AV6 | |

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V11 | Audio Output | 6K6GT | |
| V12 | Sync-Sep.-Sync Phase Inv. | 12AU7 | |
| V13 | Vert. Mult. | 6SN7GT | |
| V14 | Vert. Output | 6V6GT | |
| V15 | Horiz. AFC | 6AL5 | |
| V16 | Horiz. Mult. | 6SN7GT | |
| V17 | Horiz. Output | 6CU6GT | |
| V18 | Damper | 6AX4GT | |
| V19 | HV Rectifier | 1B3GT | |
| V20 | LV Rectifier | 5U4GB | |

## PICTURE TUBE

| ITEM No | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|
| | HOFFMAN PART No. | CBS PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V21 | 24DP4A ③ | 24DP4A ③<br>24CP24A ① | 24DP4A ① | 24DP4A ②<br>24DP4 | ① Aluminized<br>② Silver Screen "BS" |
| | 21ALP4A ③ | 21ALP4<br>21ALP4A ① | 21ALP4A ① | 21ALP4A ② | |
| | | 21ALP4B ① | | 21ALP4AA/B ③ | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | HOFFMAN PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | 100 | 350 | 4335A | ES9S345A | | WT455 | | Q-012 | TVA-1203 |
| B | 40 | 300 | | | | | | MT-4520 | |
| C | 40 | 350 | | | | | | | |
| C2A | 150 | 350 | 4339 | PR3-053 | | WT455 | | T-110 | TVA-1203 |
| B | 50 | 50 | | | | | | MT-0550 | |
| C | 30 | 350 | | | | | | | |
| C3A | 5 | 350 | 4339A | ES9C114 | BR550 | TC30 | TD-5-25 | MMT-0505 | TVA-1203 |
| B | 5 | 50 | | | BR550 | TC30 | TD-5-50 | MMT-0505 | TVA-1303 |

* Non-catalog item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | HOFFMAN PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
| C4 | 3.6 | | | | | | | | | |
| C5 | 200 | | | | | | | | | |
| C6 | 1000 | | | | | | | | | |
| C7 | 1000 | | | | | | | | | |
| C8 | 30 | | | | | | | | | |
| C9 | 1000 | | | BPD-001 | DD-102 | K080 | 801-001 | DC-521 | 5HK-DI | |
| C10 | 1500 | | | BPD-0015 | DD-152 | K07I | 801-0015 | DC-5215 | 5HK-DI5 | |
| C11 | 3-12 | | | | | | | | | |
| C12 | 3 | | | NPO-DI3 | TCZ-3R3 | Z007 | NPOA-030 | ZT-553 | 5TCCB-V33 | |
| C13 | 300 | | | | | | | | | |
| C14 | 5-3 | | | 829-3 | | | 3115-01-0R5 | CT565A | | |
| C15 | 47 | | | | | | | | | |
| C16 | 500 | | | | MPT-50 | | | | | |
| C17 | 47 | | | | 829-3 | | 3115-01-0R5 | CT565A | | |
| C18 | .5-3 | | | | TCN-10 | N018 | N750S-100 | NT-541 | 5TCU-Q1 | |
| C19 | 10 | | | N150-DII0 | | | | | | |
| C20 | 5 | | | | | | | | | |
| C21 | 1500 | | | BPD-0015 | DD-152 | K07I | 801-0015 | DC-5215 | 5HK-DI5 | |
| C22 | 500 | | | | | | | | | |
| C23 | 1500 | | | BPD-0015 | DD-152 | K07I | 801-0015 | DC-5215 | 5HK-DI5 | |
| C24 | 800 | | | | | | | | | |
| C25 | 1500 | | | BPD-0015 | DD-152 | K07I | 801-0015 | DC-5215 | 5HK-DI5 | |
| C26 | .1 | 200 | | P268N-1 | DF-104 | CUB4PI | | PT401 | 2TM-P1 | |
| C27 | 68 | | | NPO-D068 | TCZ-68 | Z038 | NPO-337-68S | | 5TCC-Q68 | Note 8 |
| C28 | 470 | | | BPD-00047 | DD-471 | K069 | 831-471 | UC-5347 | 5GA-T47 | Note 8 |
| C29 | 470 | | | BPD-00047 | DD-471 | K069 | 831-471 | UC-5347 | 5GA-T47 | |
| C30 | 470 | | | BPD-00047 | DD-471 | K069 | 831-471 | UC-5347 | 5GA-T47 | |
| C31 | 1000 | | | BPD-001 | DD-102 | K089 | 801-001 | DC-521 | 5HK-DI | |
| C32 | 3.3 | | | NPO-S3.3 | TCZ-3R3 | T205 | NPOA-3R3 | | 5TCCB-V22 | |
| C33 | 47 | | | NPO-D47 | TCZ-47 | Z033 | NPO-338-470 | ZT-5447 | 5TCC-Q47 | |
| C34 | 470 | | | BPD-00047 | DD-471 | K069 | 831-471 | UC-5347 | 5GA-T47 | |
| C35 | 470 | | | BPD-00047 | DD-471 | K069 | 831-471 | UC-5347 | 5GA-T47 | |
| C36 | 1000 | | | BPD-001 | DD-102 | K089 | 801-001 | DC-521 | 5HK-DI | |
| C37 | 33 | | | NPO-D033 | TCZ-33 | Z039 | NPO-1-330 | ZT-5443 | 5TCC-Q33 | |
| C38 | 330 | | | BPD-00033 | DD-331 | | 8II-331 | UC-5333 | 5GA-T33 | |
| C39 | 1000 | | | BPD-001 | DD-102 | K089 | 801-001 | DC-521 | 5HK-DI | |
| C40 | 1000 | | | BPD-001 | DD-102 | K089 | 801-001 | DC-521 | 5HK-DI | |
| C41 | 1000 | | | BPD-001 | DD-102 | K089 | 801-001 | DC-521 | 5HK-DI | |
| C42 | 39 | | | SHD | DD-390 | | GPIE-100 | | 5GA-Q1 | |
| C43 | 4.7 | | | NPO-S4.7 | TCZ-4R7 | T207 | NPOA-4R7 | ZT-5547 | 5TCCB-V47 | |
| C44 | . | 200 | | P268N-1 | DF-104 | CUB4PI | | PT401 | 2TM-P1 | Note 1 |
| C45 | 6000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-535 | 5HK-D5 | |
| C46 | 1000 | | | BPD-001 | DD-102 | K089 | 801-001 | DC-521 | 5HK-DI | |
| C47 | 47 | | | | | | | | | |
| C48 | .1 | 400 | | P468N-1 | DF-104 | CUB4PI | | PT401 | 4TM-P1 | |
| C49 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C50 | 2.2 | | | BPD-SE2.2 | TCZ-2R2 | | NPOA-2R2 | | 5TCCB-V22 | |
| C51 | 47 | | | | | | | | | |
| C52 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-535 | 5HK-D5 | Note 2 |
| C53 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-535 | 5HK-D5 | Note 2 |
| C54 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-535 | 5HK-D5 | |
| C55 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-535 | 5HK-D5 | |
| C56 | 5000 | | | BPD-005 | DD-502 | K080 | 811-005 | DC-535 | 5HK-D5 | |
| C57 | .0047 | 300 | | SI4700 | DE-472 | CUB5DI | GP2-333-472 | PT2347 | 6TM-D47 | |
| C58 | .015 | 400 | | BPD-015 | DD15-153 | CUB6S15 | 817-015 | PT6115 | 6TM-S15 | |
| C59 | .22 | 400 | | P468N-33 | | CUB4P22 | | PT4022 | 4TM-P22 | |
| C60 | .0033 | 300 | | SI3300 | DE-332 | CUB5D33 | GP3-333-332 | PT5233 | 6TM-D33 | |
| C61 | 330 | | | BPD-00033 | DD-331 | | Q0SI | 811-331 | UC-5333 | 5GA-T33 | |
| C62 | .0047 | 300 | | SI4700 | DE-472 | CUB5D47 | GP2-333-472 | PT2347 | 6TM-D47 | |
| C63 | .0022 | 300 | | SI2300 | DE-222 | CUB6D22 | GP3-333-222 | PT6222 | 6TM-D22 | |
| C64 | .0047 | 300 | | SI4700 | DE-472 | CUB5D47 | GP2-333-472 | PT2347 | 6TM-D47 | |
| C65 | .0047 | 300 | | SI4700 | DE-472 | CUB5D47 | GP2-333-472 | PT2347 | 6TM-D47 | |
| C66 | .0039 | 400 | | 1484-0039 | | 1R3D39 | | MCB463 | M2-339 | |
| C67 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C68 | .1 | 600 | | P668N-1 | DF-104 | CUB4PI | | PT601 | 6TM-P1 | |
| C69 | .1 | 600 | | P568N-1 | DF-104 | CUB4PI | | PT501 | 5TM-P1 | |
| C70 | .1 | 400 | | P468N-1 | DF-104 | CUB4PI | | PT401 | 4TM-P1 | |
| C71 | .047 | 400 | | BPD-05 | BPD-05 | CUB4S47 | | PT6147 | 4TM-S47 | |
| C72 | .001 | 300 | | SI1000 | DE-102 | CUB4DI | GP3L-103 | PT4231 | 6TM-D1 | |
| C73 | .001 | 300 | | SI1000 | DE-102 | CUB5DI | GP3L-103 | PT5231 | 6TM-D1 | |

## CAPACITORS (cont)

| ITEM No. | RATING | | HOFFMAN PART No. | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C74 | .0047 | 200 | | SI470G | DE-472 | CUB5D47 | GP3-333-472 | PT2347 | 6TM-D47 | |
| C75 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C76 | 3900 | 500 | | 1484-0039 | | 1R3D39 | | MCE453 | M5-339 | |
| C77 | 470 | 500 | | 1469-00047 | D6-471 | CUB6D47 | | MCB345 | M6-347 | |
| C78 | 22 | | | SI22 | D6-220 | T2P22 | GPUK-220 | UC-5422 | 5GA-Q22 | |
| C79 | .22 | 600 | | P468N-228 | | CUB4P22 | | PT4022 | 4TM-P22 | Note 3 |
| C80 | 470 | 500 | | 1469-00047 | D6-471 | CUB5D47 | 811-471 | MCB345 | M5-347 | |
| C81 | .001 | 400 | | SI1000 | DE-102 | CUB5DI | GPL3-103 | PT531 | 5TM-D1 | Note 4 |
| C82 | .1 | 600 | | P468N-1 | DF-104 | CUB4PI | | PT401 | 4TM-P1 | |
| C83 | .047 | 600 | | BPD-05 | BPD-05 | CUB6S47 | | PT6147 | 6TM-S47 | |
| C84 | .1 | 600 | | P668N-1 | DF-104 | CUB6PI | | PT601 | 6TM-P1 | Note 3 |
| C85 | 82 | 3000 | | | DD300-830 | | | | | Note 3 |
| C86 | 82 | 3000 | | | DD30-830 | | | | | Note 3 |
| C87 | 82 | | | | DD30-830 | | | | | Note 5 |
| C88 | .0047 | | | | | | | | | Note 5 |
| C89 | .47 | | | | | | | | | Note 5 |
| C90 | 470 | | | BPD-00047 | DD-471 | K060 | 831-471 | UC-5347 | 5GA-T47 | Note 7 |

Note 1. Some versions may use .01MFD in this application.
Note 2. In some versions C52 and C53 are combined in a dual 5000MMF unit.
Note 3. Not used in Chassis 318.
Note 4. Chassis 318 uses 5000MMF in this application.
Note 5. Used only in Chassis 318.
Note 6. Chassis 318 may use 140MMF in this application.
Note 7. Not used in some versions.
Note 8. Not used when tuner 9855 is used.

## CONTROLS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | HOFFMAN PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 500KΩ | ½ | H4880A | AB-60 | A47-500K-Z | Q13-153 | U48 | Volume |
| B | Shaft | | Not Req. | AK-4 | KSS-3 | Not Req. | Not Req. | Attach to R1A. |
| C | Switch | | Not Req. | KB-1 | SWE-13 | T6-1 | UB26 | Attach to R1A. |
| R2A | 500Ω | ½ | H4878A | AB-4 | A47-500-S | Q11-103 | U3 | Contrast |
| B | Shaft | | Not Req. | AK-4 | KSS-3 | Not Req. | Not Req. | Attach to R2A. |
| R3A | 150KΩ | ½ | H4878A | AB-43 | A47-150K-S | Q11-338 | U43 | Brightness |
| B | Shaft | | Not Req. | AK-4 | KSS-3 | Not Req. | Not Req. | Attach to R3A. |
| R4A | 1Meg | ½ | H4877A | AB-69 | A47-1Meg-S | Q11-157 | U54 | Vert. Hold |
| B | Shaft | | Not Req. | AK-4 | KSS-3 | Not Req. | Not Req. | Attach to R4A. |
| R5A | 3Meg | ½ | H4965-2 | BX-75 | A47-3Meg-S | Q11-339 | TA36L | Focus |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | Not Req. | Not Req. | Attach to R5A. |
| R6A | 1Meg | ½ | H4970-2 | AB-86 | A47-1Meg-S | Q11-141 | PTA68L | AGC |
| B | Shaft | | Not Req. | AK-1 | KN-3 | Not Req. | Not Req. | Attach to R6A. |
| R7A | 3Meg | ½ | H4965 | BX-75 | A47-3Meg-S | Q11-139 | TA36L | Height |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | Not Req. | Not Req. | Attach to R7A. |
| R8A | 2000Ω | 2 | H4827A | VK-131 | A45-2000 | WK-2000 | R3500L | Vert. Linearity-Wire Wound |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | Not Req. | Not Req. | Attach to R8A. |
| R9 | 1Meg | | 4956A | | | | | Tone & Phono-TV Switch - Note 1 |

Note 1. Used in chassis 318 only.

## RESISTORS

**All wattages 1/2 watt, or less, unless otherwise listed.**

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | HOFFMAN PART No. | IRC PART No. | |
| R10 | 10KΩ | | | BTA-1000 | |
| R11 | 1000Ω | | | BTS-1000 | |
| R12 | 100Ω | | | | |
| R13 | 47KΩ | | | BTS-47K | |
| R14 | 22KΩ | | | BTS-22K | |
| R15 | 470KΩ | | | BTS-470K | |
| R16 | 820KΩ | | | BTS-820K | |
| R17 | 1500Ω | 1 | | BTA-1500 | |
| R18 | 10KΩ | | | | |
| R19 | 3300Ω | 1 | | BTA-3300 | |
| R20 | [illegible] | | | | |
| R21 | 27KΩ | | | BTS-27K | |
| R22 | 100KΩ | | | BTS-100K | |
| R23 | 220KΩ | | | BTS-220K | |
| R24 | 100KΩ | | | BTS-100K | |
| R25 | 8200Ω | | | BTS-8200 | |
| R26 | 100KΩ | | | BTS-100K | |
| R27 | 1800Ω | 1 | | BTA-1800 | |
| R28 | 1000Ω | | | BTS-1000 | |
| R29 | 1.5Meg | | | BTS-1.5Meg | Note 1 |
| R30 | 470KΩ | | | BTS-470K | Note 8 |
| R31 | 8.2Meg | | | BTS-8.2Meg | Note 8 |
| R32 | 470Ω | | | BTS-470 | |
| R33 | 470Ω | | | BTS-470 | |
| R34 | 47KΩ | | | BTS-47K | |
| R35 | 470Ω | | | BTS-470 | |
| R36 | 470Ω | | | BTS-470 | |
| R37 | 470Ω | | | BTS-470 | |
| R38 | 22KΩ | | | BTS-22K | |
| R39 | 470Ω | | | BTS-470 | |
| R40 | 47Ω | | | BTS-47 | |
| R41 | 470Ω | | | BTS-470 | |
| R42 | 180Ω | | | BTS-180 | |
| R43 | 1000Ω | 3 | | BTB-1000 | |
| R44 | 12KΩ | | | BTS-12K | |
| R45 | 4700Ω | | | BTS-4700 | |
| R46 | 22KΩ | | | BTS-22K | |
| R47 | 330KΩ | | | BTS-330K | |
| R48 | 2.2Meg | | | BTS-2.2Meg | |
| R49 | 470KΩ | 4 | H-4461S | | |
| R50 | 68KΩ | | | BTS-68K | |
| R51 | 270KΩ | | | BTS-270K | |
| R52 | 22KΩ | | | BTS-22K | |
| R53 | 10KΩ | | | BTS-10K | |
| R54 | 8800Ω | | | BTS-8800 | |
| R55 | 150Ω | | | BTS-150 | |
| R56 | 180Ω | | | BTS-180 | |
| R57 | 10KΩ | | | BTS-10K | |
| R58 | 10KΩ | | | BTS-10K | |
| R59 | 10Meg | | | BTS-10Meg | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | HOFFMAN PART No. | IRC PART No. | |
| R60 | 470KΩ | | | BTS-470K | |
| R61 | 560KΩ | | | BTS-560K | |
| R62 | 560Ω | 1 | | BTA-560 | |
| R63 | 220KΩ | | | BTS-220K | |
| R64 | 10KΩ | | | BTS-10K | |
| R65 | 330KΩ | | | BTS-330K | |
| R66 | 1.5Meg | | | BTS-1.5Meg | |
| R67 | 470KΩ | | | BTS-470K | |
| R68 | 2200Ω 5% | 1 | | BTA-2200 5% | |
| R69 | 2200Ω | 1 | | BTA-2200 | |
| R70 | 1800Ω | | | BTS-1800 | |
| R71 | 1800Ω 5% | | | BTS-1800 5% | |
| R72 | 470Ω | | | BTS-470 | |
| R73 | 22KΩ | | | BTS-22K | |
| R74 | 8200Ω | | | BTS-8200 | |
| R75 | 8200Ω | | | BTS-8200 | |
| R76 | 4.7Meg | | | BTS-4.7Meg | |
| R77 | 180KΩ | 2 | | BTB-180K | |
| R78 | 1000Ω 5% | 1 | | BTA-1000 5% | |
| R79 | 680KΩ | 1 | | BTA-680K | |
| R80 | 1.2Meg | | | BTS-1.2Meg | |
| R81 | 680Ω | | | BTS-680 | |
| R82 | 100Ω | | | BTS-100 | |
| R83 | 470Ω | 1 | | BTA-470 | |
| R84 | 390Ω | | | | |
| R85 | 560Ω | | | | |
| R86 | 100KΩ | | | | |
| R87 | 100KΩ | | | | |
| R88 | 4.7Meg | | | | |
| R89 | 470KΩ | | | | |
| R90 | 560Ω | | | | |
| R91 | 680Ω | | | | |
| R92 | 1500Ω 5% | | | | |
| R93 | 100Ω | | | | |
| R94 | 82KΩ | | | | |
| R95 | 12KΩ | | | | |
| R96 | 560Ω | | | | |
| R97 | 100Ω | 2 | | BTB-1000 | |
| R98 | 180KΩ | | | | |
| R99 | 12KΩ | 2 | | | |
| R100 | 470Ω | | | | |
| R101 | 2.2Ω | | | HW½-2.2 | |
| R102 | 15Ω | 1 | | | |
| R103 | 12Ω | 10 | 470LA | | |
| R104 | 2000Ω | 7 | 471BA | PWT-2000 | |
| R105 | 5600Ω | | | BTS-5600 | |
| R106 | 330KΩ | | | BTS-330K | |
| R107 | 10Ω | | | | |
| R108 | 12Ω | 4 | 471BA | | |

Note L. Some versions use a 330KΩ ½W resistor in this application.
Note 2. Chassis 318 uses a 470Ω ½W resistor in this application and is part of Deflection Yoke T4.
Note 3. In Chassis 318 a 12KΩ ½W resistor is used in this application.
Note 4. In Chassis 318 a 330KΩ ½W resistor is used in this application.
Note 5. In Chassis 318 a 470Ω 2W resistor is used in this application.
Note 6. In Chassis 318 a 2.7Ω ½W (WW) resistor is used in this application.
Note 7. Not used in Chassis 318.
Note 8. Not used in some versions.
Note 9. Used in Chassis 318.

## TRANSFORMER (POWER)

| ITEM No | RATING | | | | REPLACEMENT DATA | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | PRI | SEC. 1 | SEC. 2 | SEC. 3 | HOFFMAN PART No | Halldorson PART No | Merit PART No | Stancor PART No | Thordarson PART No | Triad PART No |
| T1 | 117VAC ② 1.76A | 570VCT ② 270A | 5V ③ 3A | 6.3V ③ .10A | H5073 | | | | | |

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No | USE | REPLACEMENT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | HOFFMAN PART No. | Halldorson PART No. | Merit PART No. | RCA TYPE No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T2 | Horiz. Output Trans. | 5158A ①<br>5154A ② | | | | | | | |
| T3 | Vert. Output Trans. | 2190A ③<br>5155A ① | 2190 ③<br>2190 ④ | A-2823 ③<br>A-2823 ④ | | V307 ③<br>V307 ④ | A-8142 ③<br>A-8142 ④ | 26S72 ③<br>26S72 ④ | A-108X ③<br>A-108X ④ |
| T4A | Yoke (90°) Horiz. (19.5MH) | 99787-3 ① | DF607 ③ | MDF-92 ③ | 235D1 ③ | Y90F19/43 ③ | DY-16A ③ | Y-16 ③ | Y-41-1 ③ |
| B | Vert. (40MH) | 99787 ① ③ | DF607 ④ | MDF-92 ④ | 235D4 ④ | Y90F19/43 ④ | DY-16A ④ | Y-16 ④ | Y-41-1 ④ |
| T4A | Yoke (90°) Horiz. (13MH) | 99785 ① ③ | DF606 ③ | MDF-91 ③ | 237D1 ③ | Y90F2L/47 ③ | DY-15A ③ | Y-14 ③ | Y-40-1 ③ |
| B | Vert. (40MH) | | | | | | | | |
| T5 | Width Coil (2.7-17MH) | 5464 ① | RF800 ③ | MWC-11 ③ | 212R1 ③ | 20LR16 ③ | WC-5 ③ | WC-18 ③ | WC-12 ③ |
| | Width Coil (3.5-24MH) | 5571 ② | RF800 ④ | MWC-11 ④ | 215R1 ④ | 20LR16 ④ | WC-5 ④ | WC-18 ④ | WC-13 ④ |

① Used in Chassis 318, -U, and 319, -U.
② Used in Chassis 318, -U only.
③ Alternate Hoffman part number.
④ Use 8 to 1 turns ratio.
⑤ Drill new mounting hole(s).
⑥ Includes capacitor C87, resistors R84 and R85 (Also R100 in 99785 Yoke).
⑦ Connect horizontal yoke damping network across terminals #3 and #7.
⑧ Use original horizontal yoke damping network if necessary.
⑨ Enlarge mounting hole.
⑩ Use terminals #1 and #2.
⑪ Use red and blue terminals.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | PRI | SEC. | HOFFMAN PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T6 | 7.5KΩ | 3-4Ω | 5160A | 21U5 | A-2931 | A-3878 | 24S52 | S-7X | |

## SPEAKER

| ITEM No. | RATINGS | | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP | | HOFFMAN PART No. | QUAM PART No. | RCA TYPE No | |
| SP1 | 4" | PM | 3-4Ω | | SP417 ① | 4A07 | 223S1 | ① Used in Models K101, -U, B101, -U, M101, -U, |
| | 5-1/4" | PM | 3-4Ω | | SP69R ② | 5A1 | 217S1 | M102, -U, B102, -U, K1054, -U. |
| | 6" | PM | 3-4Ω | | SP619 ③ | 6A21 | 226S1 | ② Used in Models M103, -U, WD31, -U, B1031, -U, |
| | 6"x 11" | PM | 3-4Ω | | SP079 ④ | | | P1031, -U. |
| | 10" | PM | 3-4Ω | | SP92 ⑤ | 10A31 | 236S1 | ③ Used in Models M1041, -U, WD41, -U, B1041, -U, |
| | 12" | PM | 3-4Ω | | SP120 ⑥ | 12A31 | 112S1 | P1041, -U. |
| | | | | | | | | ④ Used in Models M3001, -U, W3001, -U, B3001, -U, P3001, -U. |
| | | | | | | | | ⑤ Used in Models M3054, -U, W3054, -U, B3054, -U P3054, -U. |
| | | | | | | | | ⑥ Used in Models M3021, -U, W3021, -U, B3021, -U, P3021, -U. |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | HOFFMAN PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | 1st Video IF | .1Ω | | 5128A | | | | |
| L2 | 2nd Video IF | .1Ω | .1Ω | 5134A | | | | Includes 41.25MC Trap |
| L3 | 3rd Video IF | .1Ω | .1Ω | 5127A | | | | Includes 47.25MC Trap |
| L4 | 4th Video IF | .1Ω | .1Ω | 5154A | 17-5004 | TV-125 | 6234 | |
| L5 | Series Peaking Coil | 6.8Ω | | 5283A | 19-3100 | TV-131 | 6177 | 100 Microhenries |
| L6 | Shunt Peaking Coil | 25Ω | | 5207A | | | 5156 | 330 Microhenries |
| L7 | Series Peaking Coil | 15Ω | | 5251A | 19-4400 * | | 6194 * | 390 Microhenries; Wound on 8.2KΩ resistor. |
| L8 | 4.5MC Trap | 2.1Ω | | 5231A | | | | |
| L9 | Shunt Peaking Coil | 17Ω | | 5265A | 19-3300 | | 6126 | 470 Microhenries |
| L10 | Sound IF | 1.5Ω | | 5232A | 20-1004 | TV-124 | 1462 | |
| L11 | Ratio Det. | 13Ω | L. 5OCT | 5252A | 17-3497 | TV-115 | 6306 | Tertiary Windings, 7Ω |

* Parallel with 8.2KΩ resistor.

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES. | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI | SEC. | HOFFMAN PART No | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | RCA TYPE No. | Ram PART No. | Thordarson PART No. | |
| L12 | 50Ω | | 5447 | 19-1576 | TV-163 | 6210 | | | RS-5 | |

## CRYSTAL DIODES

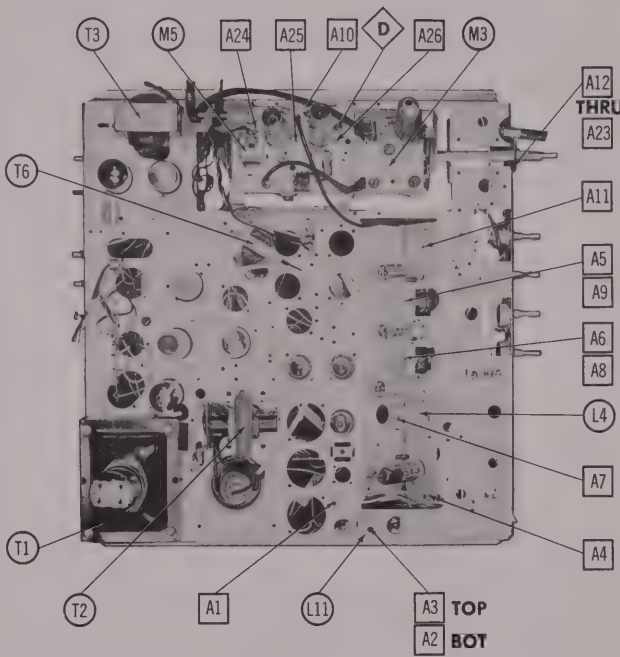
| ITEM No. | ORIG TYPE | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|
| | | HOFFMAN PART No | SYLVANIA PART No. | |
| M1 | 1N82A | 1N82 or 1N82A | URF Mixer (Clip In) | |

# PARTS LIST AND DESCRIPTIONS (Continued)

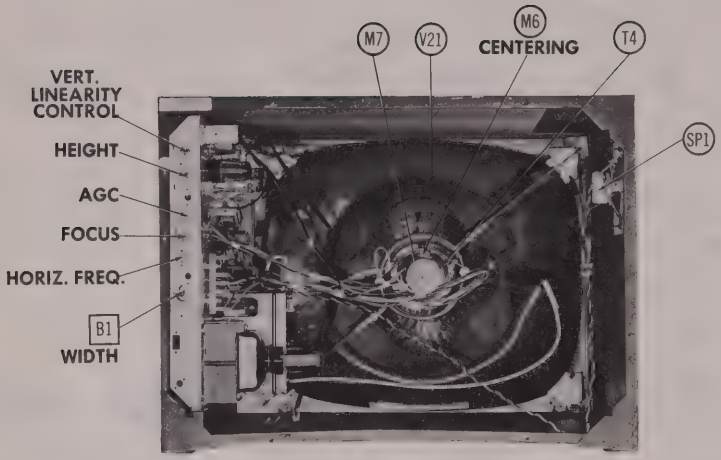
## MISCELLANEOUS

| ITEM No. | PART NAME | HOFFMAN PART No. | NOTES |
|---|---|---|---|
| M2 | Dial Light | | #47; Not used in some versions. |
| M3 | Tuner | 9881 * | VHF-UHF Combination; Chassis 316-U, 318-U, 319-U |
| M4 | Tuner | 9889 | VHF (Cascode); Chassis 318 |
| | Tuner | 9855 | VHF (Pentode); Chassis 316, 319 |
| M5 | Trap | | VHF Ant. Input Filter; Used with Tuner Part No.'s 9881, 9861, 9858. |
| M6 | Centering Device | 9722 | Chassis 316, -U, 319-U |
| | Centering Device | 9882 | Chassis 318, -U |
| M7 | Ion Trap | 9713 | For 21" Pix. Tubes |
| | Ion Trap | 9702 | For 24" Pix. Tubes |
| | Cabinet | 7944 | Black-Models K1011, U, B1011, U, M1011, U |
| | Cabinet | 7946 | Mahogany-Models K1011, U, B1011, U, M1011, U |
| | Cabinet | 7945 | Oak-Models K1011, U, B1011, U, M1011, U |
| | Cabinet | 7923 | Cherry-Models W1041, U, B1041, U, P1041, U |
| | Cabinet | 7922 | Oak-Models W1041, U, B1041, U, P1041, U |
| | Cabinet | 7921 | Walnut-Models W1041, U, B1041, U, P1041, U |
| | Cabinet | 7947 | Black-Models M1024, U, B1024, U, K1024, U |
| | Cabinet | 7949 | Mahogany-Models M1024, U, B1024, U, K1024, U |
| | Cabinet | 7948 | Oak-Models M1024, U, B1024, U, K1024, U |
| | Cabinet | 7959 | Cherry-Models M1031, U, W1031, U, B1031, U, P1031, U |
| | Cabinet | 7925 | Oak-Models M1031, U, W1031, U, B1031, U, P1031U |
| | Cabinet | 7924 | Walnut-Models M1031, U, W1031, U, B1031, U, P1031, U |
| | Cabinet | 7920 | Mahogany-Models M1041, U |
| | Cabinet | 7933 | Cherry-Models M3001, U, W3001, U, B3001, U, P3001, U |
| | Cabinet | 7931 | Mahogany-Models M3001, U, W3001, U, B3001, U, P3001, U |
| | Cabinet | 7932 | Oak-Models M3001, U, W3001, U, B3001, U, P3001U |
| | Cabinet | 7930 | Walnut-Models M3001, U, W3001, U, B3001, U, P3001, U |
| | Cabinet | 7938 | Mahogany-Models M3021, U |
| | Cabinet | 7957 | Cherry-Models W3021, U, B3021, U, P3021, U |
| | Cabinet | 7939 | Oak-Models W3021, U, B3021, U, P3021, U |
| | Cabinet | 7940 | Walnut-Models W3021, U, B3021, U, P3021, U |
| | Cabinet | 7953 | Mahogany-Models M3054, U |
| | Cabinet | 7956 | Cherry-Models W3054, U, B3054, U, P3054, U |
| | Cabinet | 7954 | Oak-Models W3054, U, B3054, U, P3054, U, P3054, U |
| | Cabinet | 7955 | Walnut-Models W3054, U, B3054, U, P3054, U |
| | Knob | K-3833-A | Brightness-Models K1011, U, B1011, U, M1011, U, M1024, U, B1024, U, K1024, U |
| | Knob | H-3833-A | Brightness-Models M1031, U, W1031, U, B1031, U, P1031, U, W1041, U, B1041, U, P1041, U, M3001, U, W3001, U, B3001, U, P3001, U, W3021, U, B3021, U, P3021, U, W3054, U, B3054, U, P3054, U |
| | Knob | R-3833-A | Brightness-Models M1041, U, M3021, U, M3054, U |
| | Knob | K-33729 | VHF Channel Selector-Models K1011, B1011, M1011, M1024, B1024, K1024 |
| | Knob | H-33729 | VHF Channel Selector-Models M1031, W1031, B1031, P1031, M3001, W3001, B3001, P3001 |
| | Knob | R-33763 | VHF Channel Selector-Models M1041, M3021, M3054 |
| | Knob | H-33763 | VHF Channel Selector-Models W1041, B1041, P1041, W3021, B3021, P3021, W3054, B3054, P3054 |
| | Knob | K-3834-A | Contrast-Models K1011, U, B1011, U, M1011, U, M1024, U, B1024, U, K1024, U |
| | Knob | H-3834-A | Contrast-Models M1031, U, W1031, U, B1031, U, P1031, U, W1041, U, B1041, U, P1041, U, M3001, U, W3001, U, B3001, U, P3001, U, W3021, U, B3021, U, P3021, U, W3054, U, B3054, U, P3054, U |
| | Knob | R-3834-A | Contrast-Models M1041, U, M3021, U, M3054, U |
| | Knob | K-3821-A | Fine Tuning-Models K1011, B1011, M1011, M1024, B1024, K1024 |
| | Knob | H-3821-A | Fine Tuning-Models M1031, W1031, B1031, P1031, M3001, W3001, B3001, P3001 |
| | Knob | R-33764 | Fine Tuning-Models M1041, M3021, M3054 |
| | Knob | H-33764 | Fine Tuning-Models W1041, B1041, P1041, W3021, B3021, P3021, W3054, B3054, P3054, |
| | Knob | R-3860-A | Phono-Tone-Models M1041, U, M3021, A, M3054, U, |
| | Knob | H-3860-A | Phono-Tone-Models W1041, U, B1041, U, P1041, U, W3021, U, B3021, U, P3021, U, W3054, U, B3054, U, P3054, U |
| | Knob | K-3832-A | Vertical Hold-Models K1011, U, B1011, U, M1011, U, M1024, U, B1024, U, K1024, U |
| | Knob | H-3832-A | Vertical Hold-Models M1031, U, W1031, U, B1031, U, P1031, U, W1041, U, B1041, U, P1041, U, M3001, U, W3001, U, B3001, U, P3001, U, W3021, U, B3021, U, P3021, U, W3054, U, B3054, U, P3054, U |
| | Knob | R-3832-A | Vertical Hold-Models M1041, U, M3021, U, M3054, U |
| | Knob | K-3835-A | On-Off-Volume-Models K1011, U, B1011, U, M1011, U, M1024, U, B1024, U, K1024, U |
| | Knob | H-3835-A | On-Off-Volume-Models M1031, U, W1031, U, B1031, U, P1031, U, W1041, U, B1041, U, P1041, U, M3001, U, W3001, U, B3001, U, P3001, U, W3021, U, B3021, U, P3021, U, W3054, U, B3054, U, P3054, U |
| | Knob | R-3835-A | On-Off-Volume-Models M1041, U, M3021, U, M3054U |
| | Knob Assy. | K-33772 | UHF Tuner (Front Section) Models K1011U, B1011U, M1011U, M1024U, B1024U, K1024U |
| | Knob Assy. | H-33772 | UHF Tuner (Front Section) Models M1031U, W1031U, B1031U, P1031U, W1041U, B1041U, P1041U, M3001U, W3001U, B3001U, P3001U, W3021U, B3021U, P3021U, W3054U, B3054U, P3054U |
| | Knob Assy. | R-33772 | UHF Tuner (Front Section) Models M1041U, M3021U, M3054U |
| | Knob Assy. | K-33773 | UHF Tuner (Center Section) Models K1011U, B1011U, M1011U, M1024U, B1024U, K1024U |
| | Knob Assy. | H-33773 | UHF Tuner (Center Section) Models M1031U, W1031U, B1031U, P1031U, W1041U, B1041U, P1041U, M3001U, W3001U, B3001U, P3001U, W3021U, B3021U, P3021U, W3054U, B3054U, P3054U |
| | Knob Assy. | R-33773 | UHF Tuner (Center Section) Models M1041U, M3021U, M3054U |
| | Knob Assy. | K-33767 | UHF Tuner (Rear Section) Models K1011U, B1011U, M1011U, M1024U, B1024U, K1024U |
| | Knob Assy. | H-33767 | UHF Tuner (Rear Section) Models M1031U, W1031U, B1031U, P1031U, W1041U, B1041U, P1041U, M3001U, W3001U, B3001U, P3001U, W3021U, B3021U, P3021U, W3054U, B3054U, P3054U |
| | Knob Assy. | R-33767 | UHF Tuner (Rear Section) Models M1041U, M3021U, M3054U |
| | Safety Glass | 803 | Models K1011, U, B1011, U, M1011, U, M1031, U, W1031, U, B1031, U, P1031, U, M3001, U, W3001, U, B3001, U, P3001, U |
| | Safety Glass | 807 | Models M1024, U, B1024, U, K1024, U |
| | Safety Glass | 804 | Models M1041, U, W1041, U, B1041, U, P1041, U, M3021, U W3021, U, B3021, U, P3021, U |
| | Safety Glass | 805 | Models M3054, U, W3054, U, B3054, U, P3054, U |
| | Mask | 22066 | Models K1011, U, B1011, U, M1011, U, M1031, U, W1031, U, B1031, U, P1031, U, M1041, U, W1041, U, B1041, U, P1041, U, M3001, U, W3001, U, B3001, U, P3001, U, M3021, U, W3021, U, B3021, U, P3021, U |
| | Mask | 22068 | Models M1024, U, B1024, U, K1024, U, M3054, U, W3054, U, B3054, U, P3054, U |

* Alternate part numbers 9861 and 9858.




CHASSIS TOP VIEW



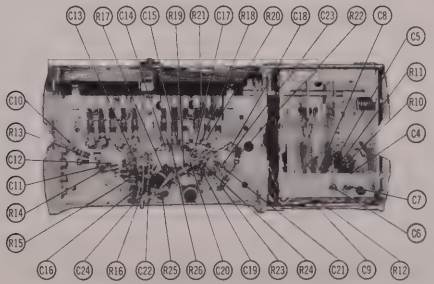

CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the horizontal frequency slug of L12 until the picture synchronizes horizontally.

Switch off channel and back again. The picture should remain in sync. Adjust horizontal width slug (B1) for picture SLIGHTLY wider than necessary to fill picture mask horizontally.




RF TUNER BOTTOM VIEW

# METEOR MODEL 4104-B (Ch. 528.45000, 1, 2, 3)

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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METEOR MODEL 4104-B (Ch. 528.45000)

| | |
|---|---|
| TRADE NAME | Meteor Model 4104-B (Ch. 528.45000, 528.45001, 528.45002, 528.45003) |
| SUPPLIER | Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois |
| TYPE SET | Television Receiver |
| TUBES | Seventeen |
| POWER SUPPLY | 110-120 Volts AC-60 Cycles RATING 1.23 Amp. @ 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC , Sound IF 41.25MC (Intercarrier) |

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METEOR MODEL
4104-B (Ch. 528.45000, 1, 2, 3)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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# DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 7 push-on type control knobs from top panel of cabinet.

2. Remove 8 wood screws. Remove rear cover.

3. Disconnect speaker leads.

4. Remove 2 wood screws holding antenna terminal bracket.

5. Remove 8 wood screws from bottom of chassis mounting board (just the screws around the edge). Lift cabinet from chassis mounting board.

6. Remove 2 speaker nuts. Remove speaker.

| MODEL | CHASSIS |
|---|---|
| 4104-B ..... | 528.45000, 528.45001, 528.45002, 528.45003 |

METEOR MODEL
4104-B (Ch. 528.45000, 1, 2, 3)

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of VHF tuner oscillator adjustments, it is necessary to remove the chassis from the cabinet. (See disassembly instructions).

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the chassis. Set the horizontal hold control to its mid-position and adjust the frequency slug (B2) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the chassis. Adjust the ratio detector secondary (L26) for maximum sound and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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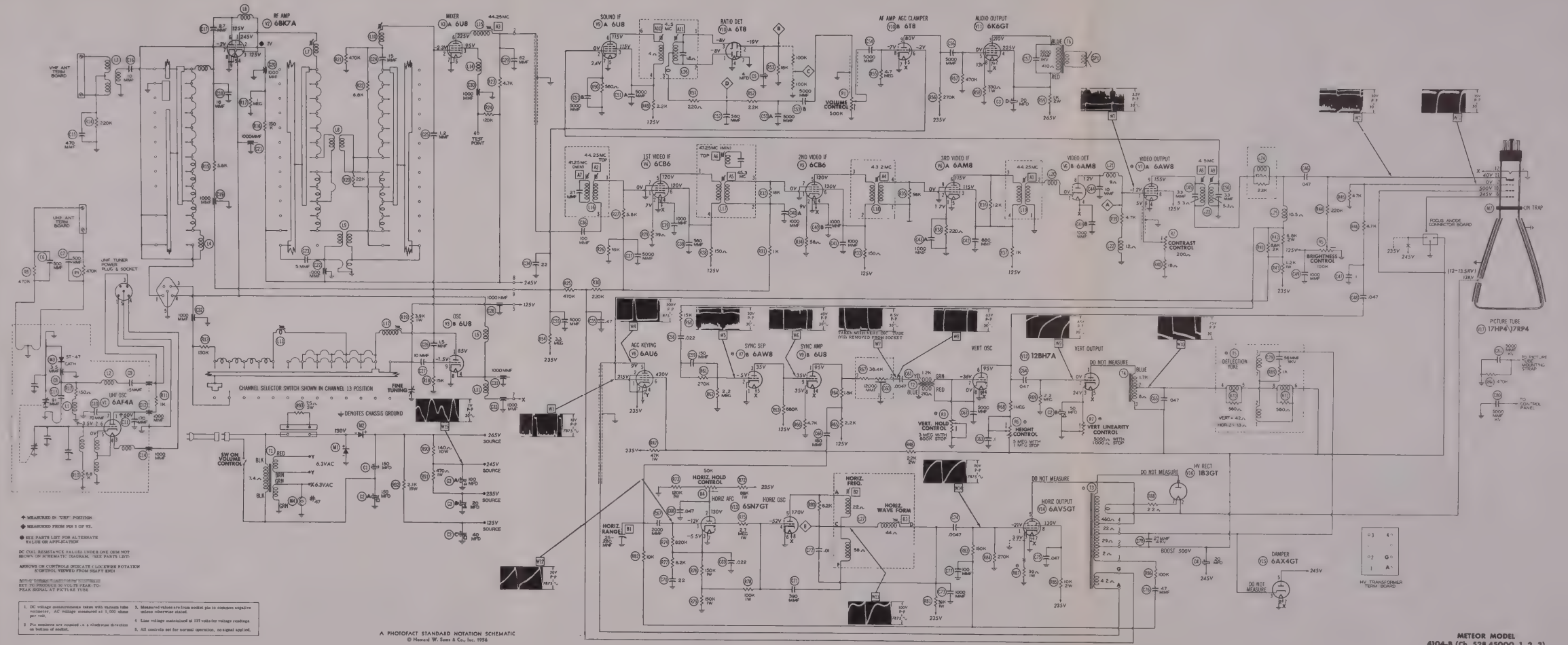
METEOR MODEL
4104-B (Ch. 528.45000, 1, 2, 3)
RF AMP 6BK7A
MIXER 6U8
SOUND IF 6U8
RATIO DET 6T8
AF AMP AGC CLAMPER 6B8
AUDIO OUTPUT 6K6GT
1ST VIDEO IF 6CB6
2ND VIDEO IF 6CB6
3RD VIDEO IF 6AM8
VIDEO DET 6AM8
VIDEO OUTPUT 6AW8
OSC 6U8
AGC KEYING 6AU6
SYNC SEP 6AW8
SYNC AMP 6U8
VERT OSC
VERT OUTPUT 12BH7A
HORIZ OSC 6SN7GT
HORIZ OUTPUT 6AV5GT
HV RECT 1B3GT
DAMPER 6AX4GT
UHF OSC 6AF4A
PICTURE TUBE 17HP4\17RP4
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
FINE TUNING
VOLUME CONTROL 500K
CONTRAST CONTROL 200K
BRIGHTNESS CONTROL 100K
VERT. HOLD CONTROL 3 MEG WITH 600K STOP
HEIGHT CONTROL 1 MEG WITH 1 MEG STOP
VERT. LINEARITY CONTROL 5000Ω WITH 1000Ω STOP
HORIZ. HOLD CONTROL 50K
HORIZ. FREQ.
HORIZ. WAVE FORM
HORIZ. RANGE
HORIZ AFC
BOOST 500V
DO NOT MEASURE
DENOTES CHASSIS GROUND
5W ON VOLUME CONTROL
VHF ANT TERM BOARD
UHF ANT TERM BOARD
UHF TUNER PLUG & SOCKET
FOCUS ANODE CONNECTOR BOARD
HV TRANSFORMER TERM BOARD
ION TRAP
TEST POINT
265V SOURCE
245V SOURCE
235V SOURCE
125V SOURCE
6.3VAC
TO CRT SOCKET USE MOUNTING STRAP
TO CONTROL PANEL
◆ MEASURED IN "OFF" POSITION
◆ MEASURED FROM PIN 3 OF V1.
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
SET TO PRODUCE 90 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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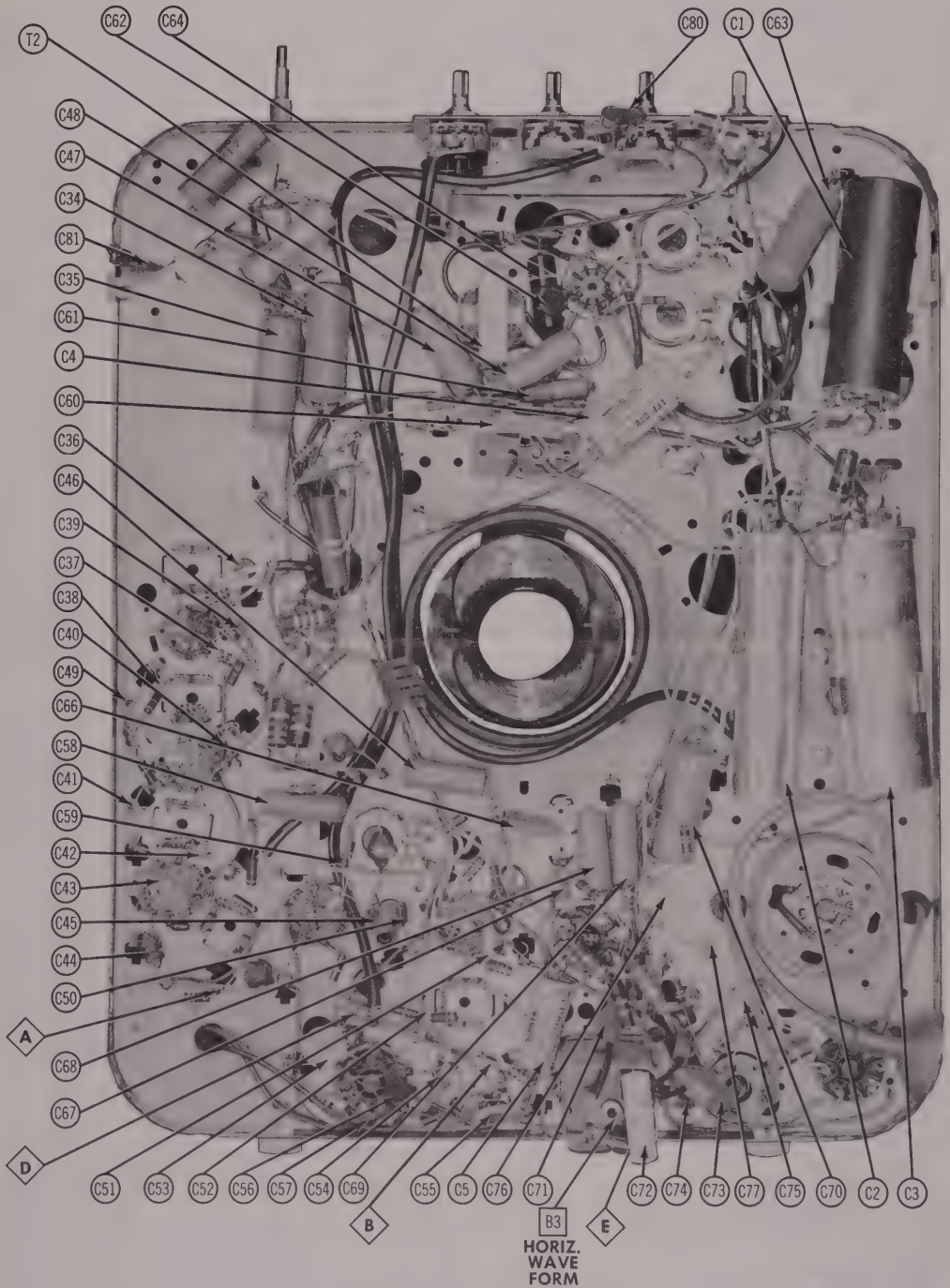
METEOR MODEL
4104-B (Ch. 528.45000, 1, 2, 3)




CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

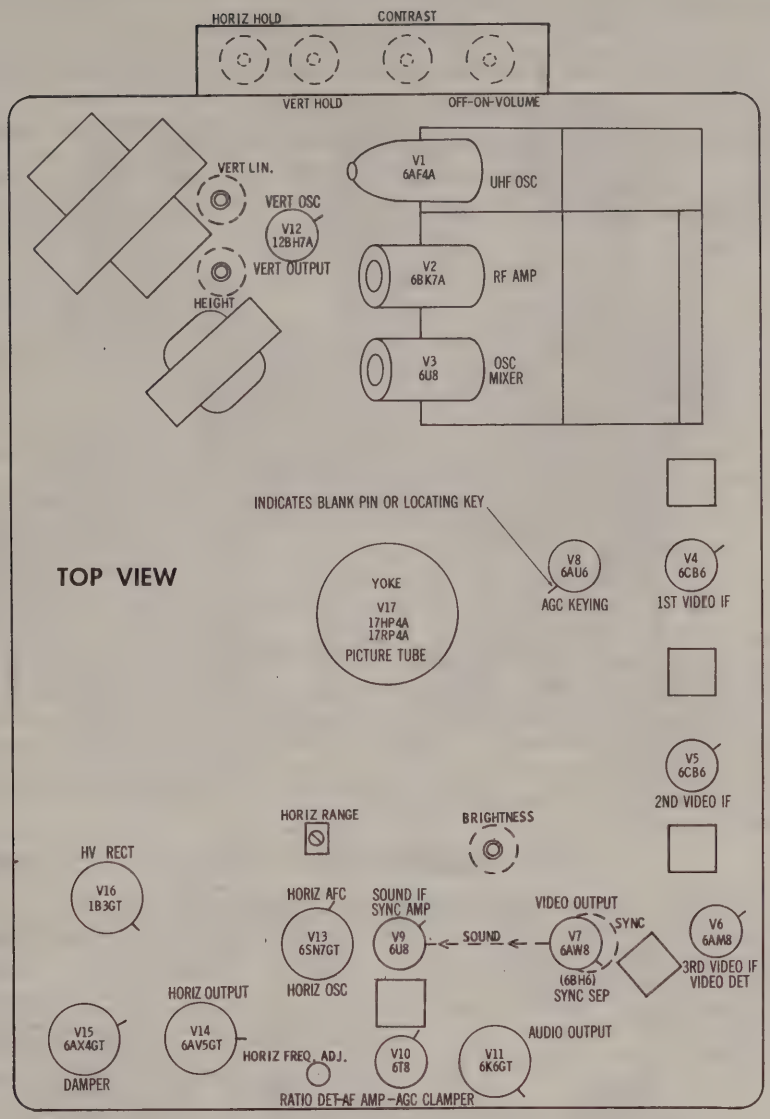
4104-B (Ch. 528,45000, 1, 2, 3)

METEOR MODEL

**METEOR MODEL**
**4104-8 (Ch. 528.45000, 1, 2, 3)**

**CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION**

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenimum Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, V6, V7 (V1 UHF only)**
No pic, no sound, has snow - **V2, V3, V4**
No pic, has sound, has raster - **V7, V8, V17**
Has pic, no sound - **V9, V10, V11**
Overloaded picture - **V8, V10**

SYNC FAILURE
No vert. sync - **V9, V12**
No horiz. sync - **V9, V13**
No vert. or horiz. sync - **V7, V9**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V17**
No vertical deflection - **V12**
Poor vert. linearity or foldover - **V12**
Poor horiz. linearity or foldover - **V13, V14, V15**
Narrow picture - **V13, V14, V15, V16, M1, M2**
Vert. off freq. - **V9, V12**
Horiz. off freq. - **V9, V13**

L. F. DENENSHIP
DENVER, COLORADO

# ALIGNMENT INSTRUCTIONS

## ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis.
Use an isolation transformer to protect the test equipment.

## VIDEO IF ALIGNMENT

Connect the negative lead of a 4.5 volt bias to the ungrounded side of R26. Connect a short clip lead across the antenna terminals. Adjust generator output to maintain not more than 2.5 volts on VTVM. When adjusting for minimum readings, increase generator output to provide a definite dip on the VTVM.
When a separate marker generator is used, loosely couple to the sweep generator output lead.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to floating tube shield over converter tube. Low side to chassis. | Not used | 44.25MC | Any non-interfering channel | USE VTVM. DC probe to point (A). Common to chassis. | A1 | Detune A2, A5, A6 and A7 by turning cores fully counter clockwise. Adjust A1 for maximum deflection. |
| 2. | " | " | " | 44.25MC | " | " | A2 | Detune A3. Adjust A2 for maximum deflection. |
| 3. | " | " | " | 44.25MC | " | " | A3 | Adjust for maximum reading. |
| 4. | " | " | " | 43.2MC | " | " | A4 | " |
| 5. | " | " | " | 45.3MC | " | " | A5 | " |
| 6. | " | " | " | 47.25MC | " | " | A6 | Adjust for MINIMUM deflection. Repeat steps 5 and 6. |
| 7. | " | " | " | 41.25MC | " | " | A7 | Adjust for MINIMUM deflection. |
| 8. | " | " | 44.25MC (10MC Swp) | 41.25MC<br>42.75MC<br>43.8MC<br>44.25MC<br>45.0MC<br>45.75MC<br>47.25MC | " | " | | Check for response curve similar to Fig. 1. Retouch A3 to place 45.75MC at 50% point. Retouch A7 for correct tilt. |

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set the contrast control fully clockwise.
Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 9. | .001MFD | High side to pin 7 (grid) of video output (V7). Low side to chassis. | 4.5MC (Unmod) | Any | DC probe to point (B). Common to chassis. | A8, A9, A10 | Adjust for maximum deflection. |
| 10. | " | " | " | " | DC probe to point (D). Common to point (C). | All | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 9. | .001MFD | High side to pin 7 (grid) of video output (V7). Low side to chassis. | 4.5MC (450KC Swp) | 4.5MC | Any | Vert. Amp. thru 47KΩ to point (B). Low side to chassis. | A8, A9, A10 | Disconnect stabilizing capacitor (C5). Adjust for curve of maximum amplitude and symmetry similar to Fig. 2. |
| 10. | " | " | " | " | " | Vert. Amp. to point (D). Low side to chassis. | All | Reconnect C5 and adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines. |

## 4.5MC TRAP ALIGNMENT

Tune in the strongest TV station available. Adjust A8 for minimum 4.5MC beat interference in the picture.

## TUNER ALIGNMENT

The RF and mixer portion of this receiver have been properly aligned at the factory and are very stable. Alignment of this portion should not be required in the field.

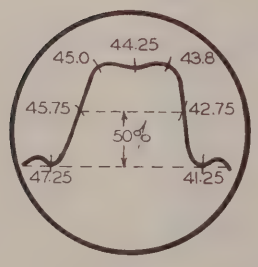


FIG.1

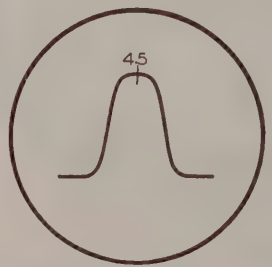
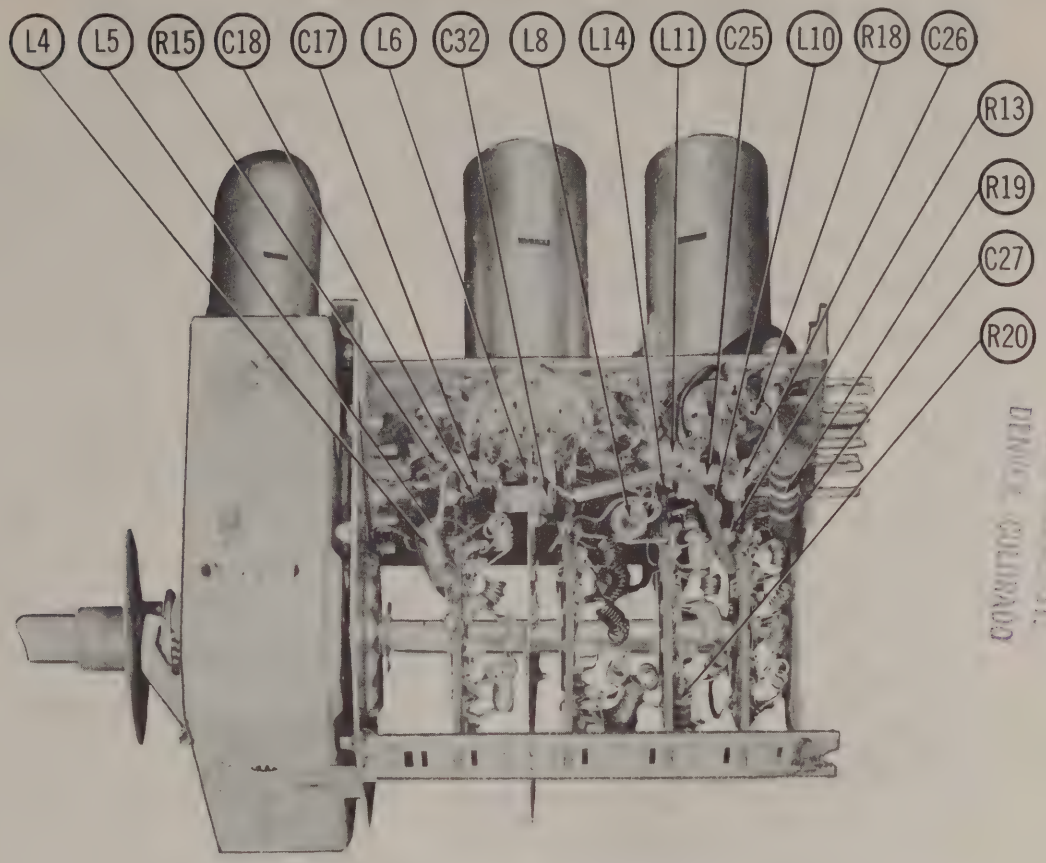
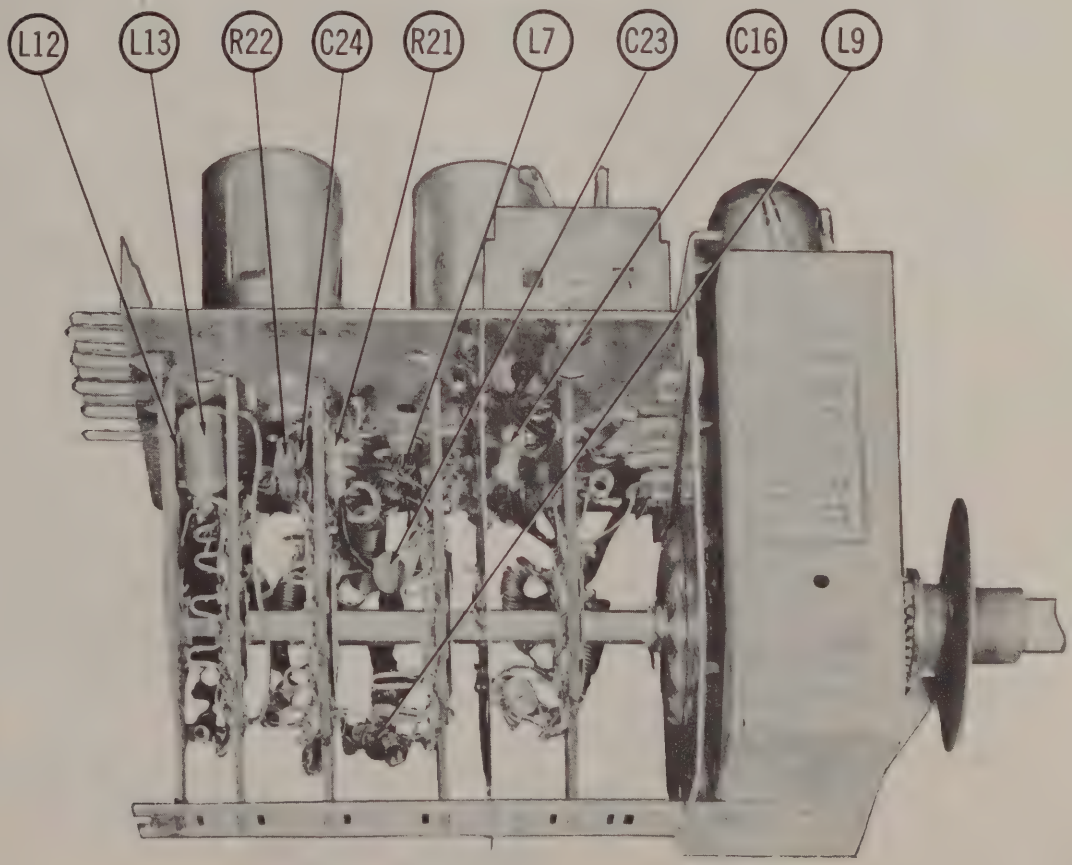


FIG. 2

FIG. 3




RF TUNER-RIGHT SIDE

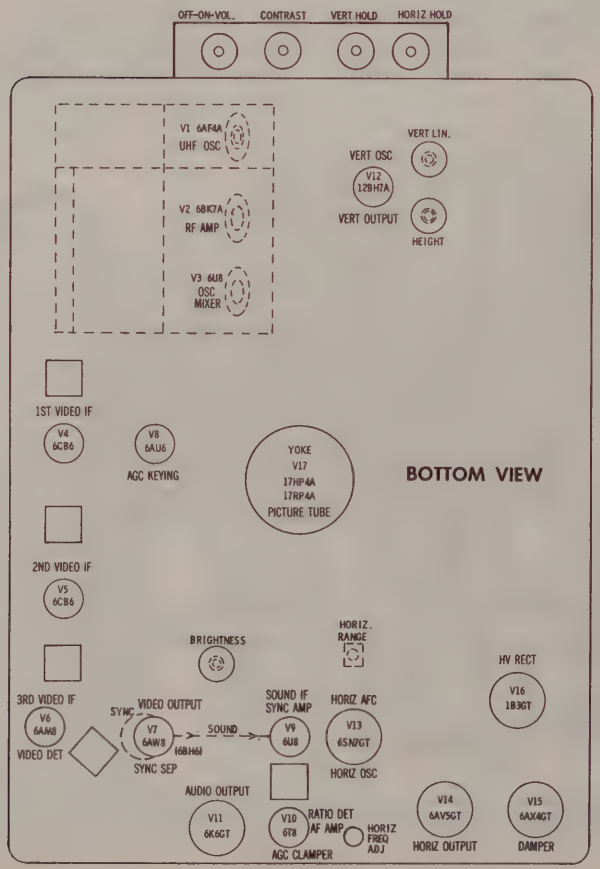



RF TUNER-LEFT SIDE

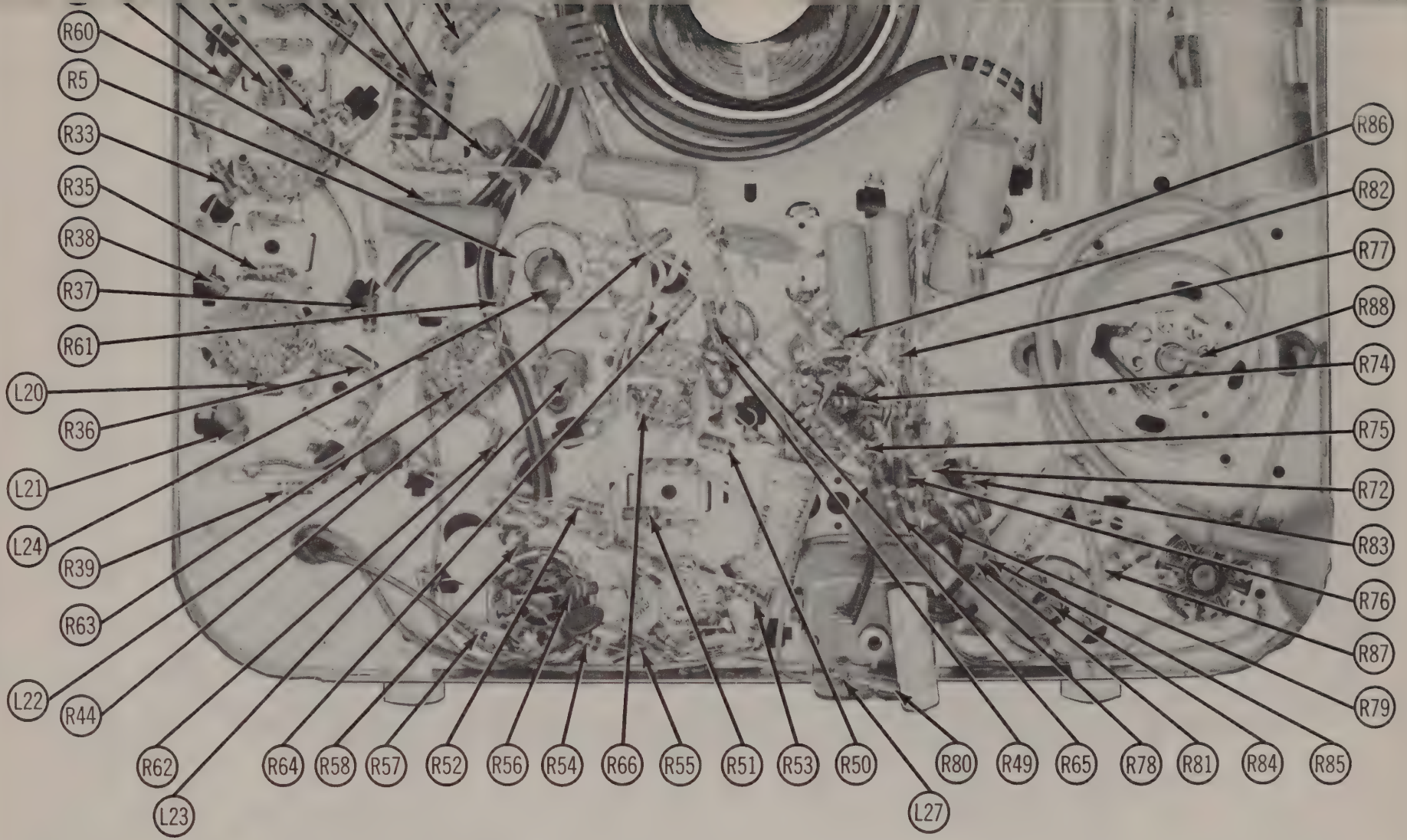
# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6AF4A | *† 7KΩ | 6.8KΩ | .1Ω | 0Ω | 0Ω | 6.8KΩ | *† 7KΩ | | |
| V2 | 6BK7A | † 140Ω | 400KΩ | INF | .1Ω | 0Ω | INF | 600KΩ | 0Ω | 0Ω |
| V3 | 6U8 | † 6KΩ | 470KΩ | † 120KΩ | .1Ω | 0Ω | † 4.8KΩ | 0Ω | 0Ω | 15KΩ |
| V4 | 6CB6 | 45KΩ | 39Ω | 0Ω | .1Ω | † 2.3KΩ | † 2.3KΩ | 0Ω | | |
| V5 | 6CB6 | 40KΩ | 56Ω | 0Ω | .1Ω | † 2.3KΩ | † 2.3KΩ | 0Ω | | |
| V6 | 6AM8 | 220Ω | .1Ω | † 3.1KΩ | .1Ω | 0Ω | † 3.1KΩ | .2Ω | 4.7KΩ | 0Ω |
| V7 | 6AW8 | 0Ω | 2.2Meg | † 680KΩ | 0Ω | .1Ω | 25Ω | 4.7KΩ | † 2.1KΩ | † 5KΩ |
| V8 | 6AU6 | † 1.8KΩ | † 600Ω | † 600Ω | † 600Ω | 250KΩ | † 47KΩ | † 600Ω | | |
| V9 | 6U8 | † 6KΩ | 5.3Ω | † 4.3KΩ | .1Ω | 0Ω | † 4.3KΩ | 560Ω | 4.7KΩ | † 680KΩ |
| V10 | 6T8 | INF | 18KΩ | INF | 0Ω | .1Ω | 600KΩ | 0Ω | 4.7Meg | † 270KΩ |
| V11 | 6K6GT | NC | .1Ω | † 1.4KΩ | † 1KΩ | 470KΩ | TP | 0Ω | 330Ω | |
| V12 | 12BH7A | ¶ 1.7KΩ | 2.2Meg | 2.1KΩ | .1Ω | .1Ω | ¶ 3Meg | 1.5Meg | 210Ω | 0Ω |
| V13 | 6SN7GT | 800KΩ | † 50KΩ | 300KΩ | 250KΩ | † 40KΩ | 0Ω | 0Ω | .1Ω | |
| V14 | 6AV5GT | 270KΩ | 0Ω | 39Ω | NC | ¶ 22Ω | NC | .1Ω | † 10KΩ | |
| V15 | 6AX4GT | NC | NC | 70KΩ | NC | † 140Ω | NC | .1Ω | 0Ω | |
| V16 | 1B3GT | | PINS | 1-8 | HAVE | INF | RESISTANCE | | | TOP CAP ¶ 482Ω |
| V17 | 17HP4A/ 17RP4A | 0Ω | 4.7KΩ | PIN 6 † 140Ω | PIN10 ¶ 15Ω | PIN 11 † 250KΩ | PIN 12 .1Ω | | | |

* MEASURED IN "UHF" POSITION.
† MEASURED FROM POSITIVE SIDE OF C1.
¶ MEASURED FROM PIN 3 OF V15.
TP-TIE POINT.
NC-NO CONNECTION.

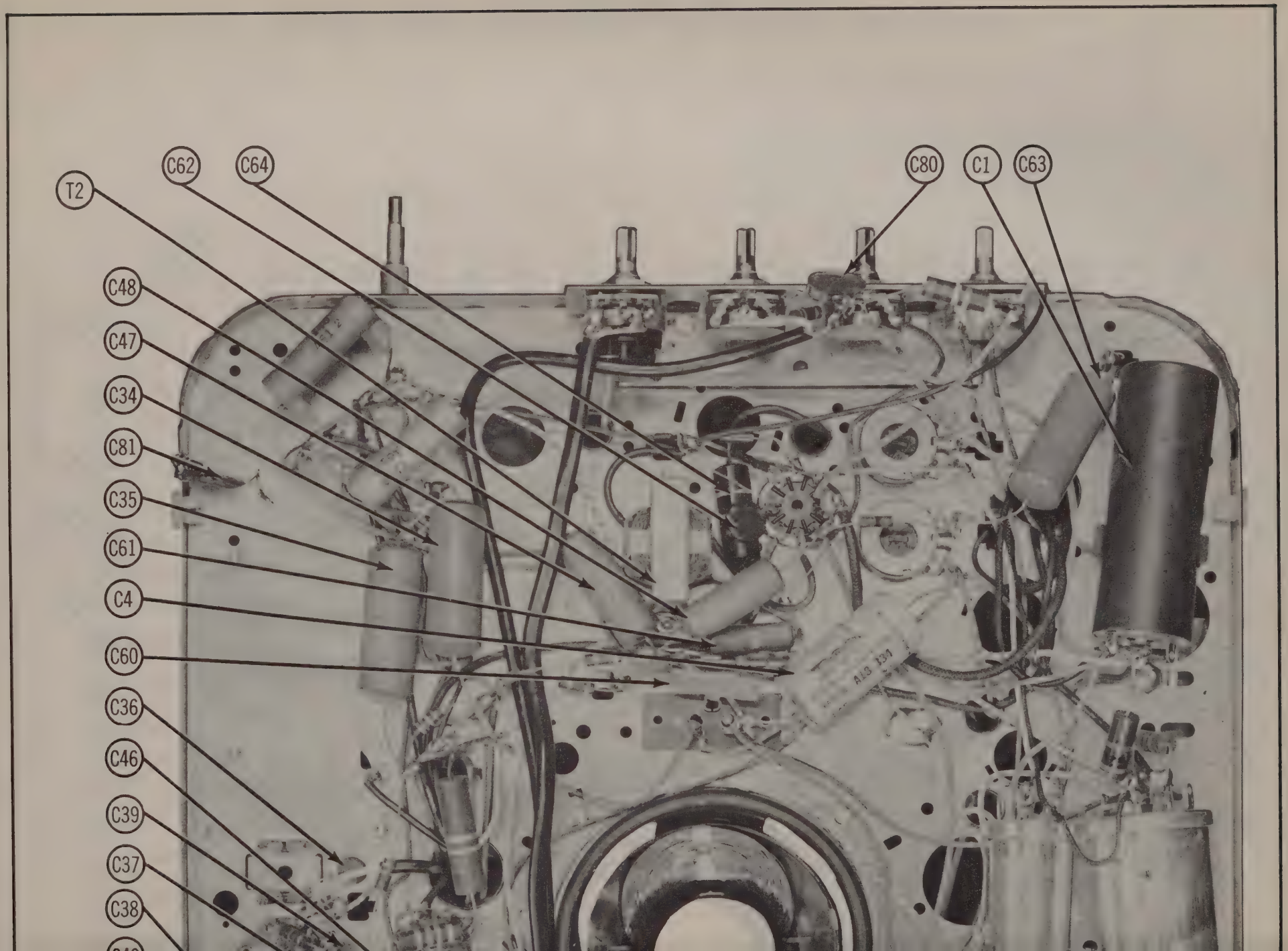


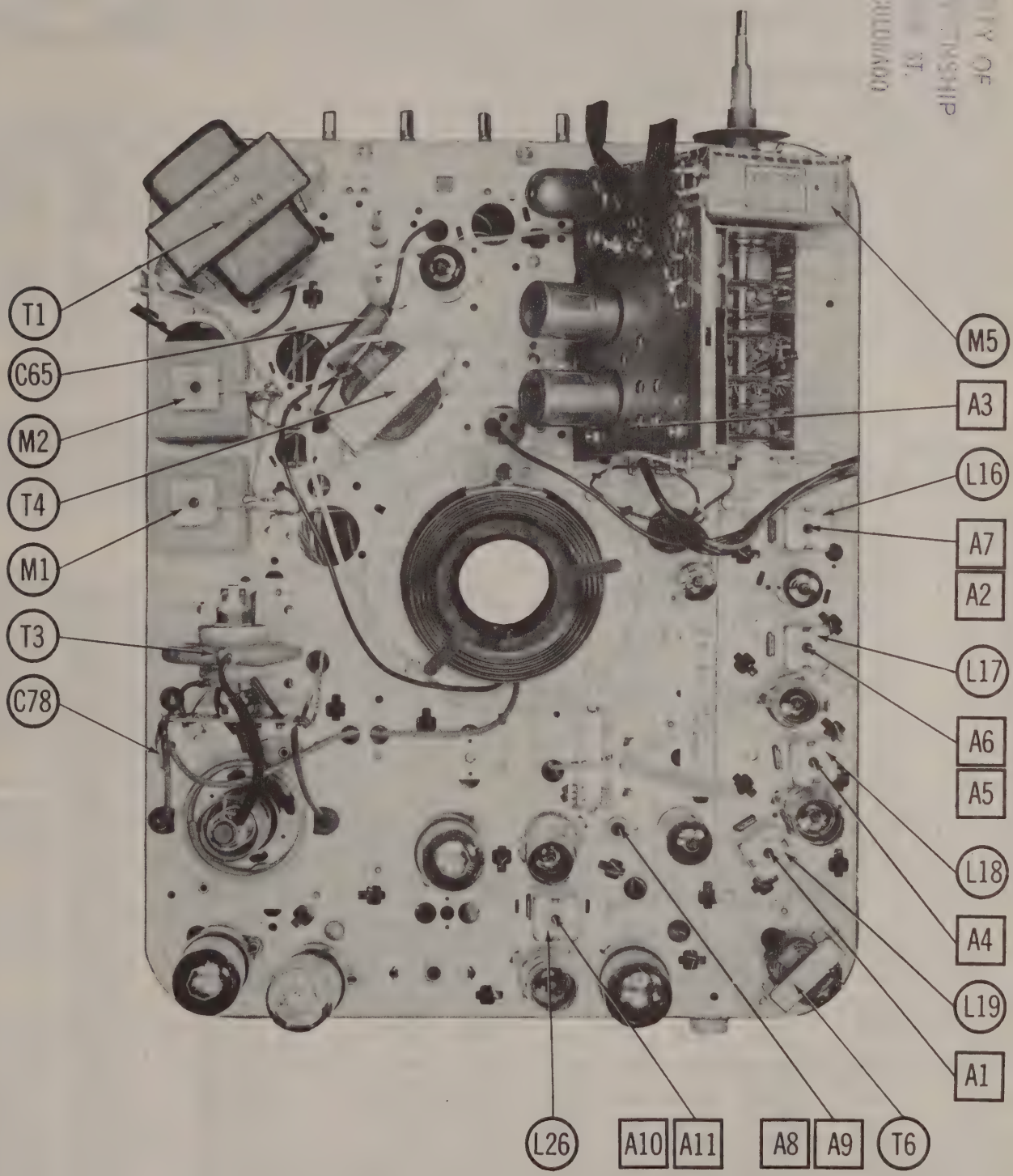

# TUBE PLACEMENT CHART




PROPERTY OF
L. F. HAMMOND SHIP
3000 MAPLE ST.
DENVER, COLORADO

## CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION


C62
C64
C80
C1
C63
T2
C48
C47
C34
C81
C35
C61
C4
C60
C36
C46
C39
C37
C38




CHASSIS TOP VIEW

SET 328 FOLDER 7

# PARTS LIST AN
CAPAC

## TUBES (GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | UHF Oscillator | 6AF4A | |
| V2 | RF Amplifier | 6BK7A | |
| V3 | Mixer-Oscillator | 6U8 | |
| V4 | 1st. Video IF Amplifier | 6CB6 | |
| V5 | 2nd. Video IF Amplifier | 6CB6 | |
| V6 | 3rd. Video IF Amplifier-Video Detector | 6AM8 | |
| V7 | Video Output-Sync Separator | 6AW8 | Note 1 |
| V8 | AGC Keying | 6AU6 | |
| V9 | Sound IF Amplifier-Sync Amplifier | 6U8 | |
| V10 | Ratio Detector-AF Amp.-AGC Clamper | 6T8 | |
| V11 | Audio Output | 6K6GT | |
| V12 | Vert. Osc.-Vert. Output | 12BH7A | |
| V13 | Horiz. AFC-Horiz. Osc. | 6SN7GT | |
| V14 | Horiz. Output | 6AV5GT | |
| V15 | Damper | 6AX4GT | |
| V16 | HV Rectifier | 1B3GT | |

Note 1. 6BH6 may be used in some versions.

## PICTURE TUBE

| ITEM No. | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|
| | METEOR PART No. | CBS PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V17 | 17HP4/17RP4 | 17HP4/17RP4 | 17HP4/17RP4 | 17HP4/17RP4 | ① Aluminized ② Silver screen "85" |
| | | 17HP4B ① | 17HP4B ① | 17HP4B ② | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | METEOR PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1 | 150 | 150 | 18-323 | AFHS1-70 | XA004 | FP117 | TD-150-150 | T-050 | TVL-1428 |
| C2A | ■150 | 150 | 18-322 | E3B387 | XA004 | FP117 | TD-150-150 | T-050 | TVL-1428 |
| B | ▲50 | 50 | | | BR505 | TC39 | TD-50-50 | FM-0550 | TVA-1308 |
| C3A | ▲100 | 300 | 18-346 | E4D972 | | FP447 | | D-177 | R2228 * |
| B | ▲20 | 300 | | | | TC68 | | MTD-3520 | |
| C | ■40 | 300 | | | | | | | |
| D | 20 | 300 | | | | | | | |
| C4 | 20 | 300 | 18-334 | PRS450V20 | BR2035 | TC65 | TD-20-350 | FM-4520 | TVA-1608 |
| C5 | 4 | 50 | 18-339 | PRS150V4 | BR550 | TC30 | TD-4-50 | MMT-0505 | TVA-1303 |

* Non-catalog item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | METEOR PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C6 | 500 | | 15-304 | BPD-0005 | | G061 | 811-501 | UC-535 | 5GA-T5 | |
| C7 | 500 | | 15-304 | BPD-0005 | | G061 | 811-501 | UC-535 | 5GA-T5 | |
| C8 | 3.5 | | 5219-501 | | | | | | | |
| C9 | 15 | | 221-150 | N750-DI15 | TCN-15 | N021 | N750K-150 | | 5TCU-Q15 | |
| C10 | 170 | | 138-3 | | | | | | | |
| C11 | 170 | | 138-3 | | | | | | | |
| C12 | 1000 | | 206-102 | EF-001 | MFT-1000 | | | | 503C-D1 | |
| C13 | .91 | | 2101-918 | | | | | | | |
| C14 | 1000 | | 206-102 | EF-001 | MFT-1000 | | | | 503C-D1 | |
| C15 | 470 | | 230-471 | BPD-00047 | DD-471 | K060 | 811-471 | UC-5347 | 5GA-T47 | |
| C16 | 10 | | 160-100 | N750-SI10 | TCN-10 | TN01 | N750A-100 | NT-541 | 5TCU-Q1 | |
| C17 | 2.7 | | 2101-279 | | | | | | | |
| C18 | 18 | | 221-180 | | TCN-18 | N022 | N750K-180 | | | |
| C19 | 1000 | | 244-1 | | | | | | | |
| C20 | 1000 | | 244-1 | | | | | | | |
| C21 | 1000 | | 244-1 | | | | | | | |
| C22 | 1000 | | 244-1 | | | | | | | |
| C23 | 15 | | 222-150 | NP0-DI15 | TCZ-15 | Z021 | N750K-150 | | 5TCC-Q15 | |
| C24 | 15 | | 222-150 | NP0-DI15 | TCZ-15 | Z021 | N750K-150 | | 5TCC-Q15 | |
| C25 | 1.2 | | 2101-129 | | | | | | | |
| C26 | 1.5 | | 170-159 | | | | | | | |
| C27 | 10 | | 227-100 | | | | | | | |
| C28 | 1000 | | 244-1 | | | | | | | |
| C29 | 62 | | 159-620 | | TCN-62 | TN17 | N750K-620 | | | |
| C30 | 1000 | | 244-1 | | | | | | | |
| C31 | 1000 | | 244-1 | | | | | | | |
| C32 | 1000 | | 244-1 | | | | | | | |
| C33 | 1000 | | 244-1 | | | | | | | |
| C34 | .22 | 200 | 16-253 | P288N-22 | | CUB2P22 | | PT4022 | 2TM-P22 | |
| C35 | .47 | 200 | 16-240 | P288N-47 | | CUB2P47 | | PT4047 | 2TM-P47 | |
| C36 | 100 | | 15-292 | NP0-DI100 | TCZ-100 | TZ30 | NP0-337-101 | ZT-531 | 5TCC-T1 | |
| C37 | 5000 | | 15-320 | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C38 | 560 | | 15-305 | DI-00056 | DD-561 | G063 | 811-561 | UC-5356 | 5GA-T56 | |
| C39 | 1000 | | 15-247 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C40A | 1000 | | 15-286 | BPD-2X001 | DD2-102 | DK069 | 812-001 | DCD-521 | 5HK-2D1 | |
| B | 1000 | | | | | | | | | |
| C41 | 1000 | | 15-247 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C42 | 680 | | 15-290 | BPD-00068 | DD-681 | G065 | 811-681 | UC-5368 | 5GA-T68 | |
| C43A | 1000 | | 15-286 | BPD-2X001 | DD2-102 | DK069 | 812-001 | DCD-521 | 5HK-2D1 | |
| B | 1000 | | | | | | | | | |
| C44 | 10 | | 15-234 | NP0-DI10 | TCZ-10 | Z018 | NP0A-100 | ZT-541 | 5TCC-Q1 | |
| C45 | 33 | | | | | | | | | |
| C46 | .047 | 400 | 16-245 | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C47 | .1 | 400 | 16-264 | P488N-1 | DF-104 | CUB4P1 | | PT401 | 4TM-P1 | |
| C48 | .047 | 400 | 16-245 | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C49 | 1000 | | 15-247 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C50 | 33 | | | | | | | | | |
| C51A | 5000 | | 15-294 | BPD-005 | DD2-502 | DK079 | 811-005 | DC-525 | 5HK-2D47 | |
| B | 5000 | | | BPD-005 | | | 811-005 | DC-525 | | |
| C52 | 560 | | 15-303 | DI-00056 | DD-561 | G063 | 811-561 | UC-5356 | 5GA-T56 | |
| C53A | 5000 | | 15-294 | BPD-005 | DD2-502 | DK079 | 811-005 | DC-525 | 5HK-2D47 | |
| B | 5000 | | | BPD-005 | | | 811-005 | DC-525 | | |
| C54 | 5000 | | 15-320 | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C55 | 5000 | | 15-320 | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C56 | 5000 | | 15-320 | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C57 | 5000 | 1000 | 15-305 | HVD-15-4700 | DD-502 | VD47 | 1R5KV-472 | | 10HK-D47 | |
| C58 | .022 | 400 | 16-248 | BPD-02 | DF-203 | CUB4S22 | 817-02 | PT4122 | 4TM-S22 | |
| C59 | 150 | | 15-295 | NP0-DI150 | TCZ-150 | TZ34 | NP0-334-151 | ZT-5315 | 5TCC-T15 | |
| C60 | 12000 | | †17-109 | †PA-501 | †PC-104 | | | | †103C12 | |
| C61 | .0047 | 600 | 16-233 | 1464-0047 | | 1R5D47 | | | MS-247 | |
| C62 | 5000 | | 15-320 | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C63 | .1 | 600 | 16-208 | P688N-1 | DF-104 | CUB6P1 | | PT601 | 6TM-P1 | |
| C64 | .047 | 400 | 16-447 | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C65 | .047 | 200 | 16-266 | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C66 | 180 | 500 | 15-300 | NP0-SI180 | TCZ-180 | 1R5T56 | NP0-334-181 | | MS-318 | |
| C67 | 2000 | | 15-228 | BPD-02 | DD-203 | K072 | 801-002 | DC-522 | 5HK-D2 | |
| C68 | .047 | 400 | 16-245 | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C69 | .022 | 200 | 16-263 | BPD-02 | DF-203 | CUB4S22 | 817-02 | PT4122 | 2TM-S22 | |
| C70 | .22 | 200 | 16-253 | P288N-22 | | CUB2P22 | | PT4022 | 2TM-P22 | |
| C71 | 390 | 500 | 15-273 | | D6-391 | 5R5T39 | 811-391 | | MS-339 | |

| ITEM No. | RATING | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|
| | CAP. | VOLT | METEOR PART No. | AEROVOX PART No. | CENTRALAB PART No. | |
| C72 | .01 | 600 | 16-262 | | | |
| C73 | 1000 | 500 | 15-288 | 1464-001 | | |
| C74 | .0047 | 600 | 16-233 | BPD-0047 | D6-472 | |
| C75 | .047 | 400 | 16-245 | BPD-05 | DF-503 | |
| C76 | 47 | | 15-265 | NP0-DI47 | TCZ-47 | |
| C77 | 100 | | 15-292 | NP0-DI100 | TCZ-100 | |
| C78 | 27 | 4000 | 15-315 | | | |
| C79 | 56 | 3000 | | | DD30-560 | |
| C80 | 5000 | 1000 | 15-305 | HVD-15-4700 | DD-502 | |
| C81 | 5000 | 1000 | 15-305 | HVD-15-4700 | DD-502 | |

† Items C60, R67A and R67B are combined in one unit.

## CONT

| ITEM No. | RATING | | REPLACEMENT | | |
|---|---|---|---|---|---|
| | RESISTANCE | WATTS | METEOR PART No. | CENTRALAB PART No. | CLAROST. PART No |
| R1A | 500KΩ | ½ | A24-221 | B8K-60-S | A47-500K |
| B | Shaft | | Not Req. | Not Req. | KSS-3 |
| C | Switch | | Not Req. | Not Req. | SWE-12 |
| R2A | 200Ω | ½ | A25-41 | AB-2 | A47-500-S |
| B | Shaft | | Not Req. | AK-4 | KSS-3 |
| R3A | 3Meg with 800K stop | ½ | A25-50D | ♦ AB-83 | ♦A47-2.5Meg |
| B | Shaft | | Not Req. | AK-4 | KSS-3 |
| R4A | 50KΩ | ½ | A25-42 | AB-31 | A47-50K- |
| B | Shaft | | Not Req. | AK-4 | KSS-3 |
| R5A | 100KΩ | ½ | A25-40 | AB-40 | A47-100K- |
| B | Shaft | | Not Req. | AK-1 | FKS-½ |
| R6A | 5Meg with 1Meg stop | ½ | † A25-43 | † AB-86 | †A47-4Meg |
| B | Shaft | | Not Req. | AK-1 | FKS-½ |
| R7A | 5000Ω with 1000Ω stop | ½ | A25-53 | * AB-9 | *A47-4000 |
| B | Shaft | | Not Req. | AK-19 | KSS-3 |

♦ Connect an 820KΩ resistor in series with the right hand term of the original control (control viewed from shaft end, termi
† Connect a 1Meg resistor in series with the right hand termina of the original control (control viewed from shaft end, termi
* Connect a 1000Ω resistor in series with the right hand termin of the original control (control viewed from shaft end, termi

## RESIST

All wattages 1/2 watt, or less

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | METEOR PART No. | IRC PART No. | |
| R8 | 470K | | 604740M | BTS-470K | |
| R9 | 470K | | 604740M | BTS-470K | |
| R10 | 6800Ω | | 106-682 | BTS-6800 | |
| R11 | 1000Ω | | 106-102 | BTS-1000 | |
| R12 | 150Ω | | 106-151 | BTS-150 | |
| R13 | 150K | | 106-154 | BTS-150K | |
| R14 | 220K | | 106-224 | BTS-220K | |
| R15 | 5600Ω | | 106-562 | BTS-5600 | |
| R16 | 750K | | 106-754 | BTS-750K 5% | |
| R17 | 1Meg | | 106-105 | BTS-1Meg | |
| R18 | 15KΩ | | 106-153 | | |
| R19 | 3900Ω | 1 | 107-392 | BTA-3900 | |
| R20 | 22KΩ | | 106-223 | | |
| R21 | 470K | | 106-474 | BTS-470K | |
| R22 | 6800Ω | | 106-682 | BTS-6800 | |
| R23 | 4700Ω | | 106-472 | BTS-4700 | |
| R24 | 120KΩ | | 106-124 | BTS-120K | |
| R25 | 470KΩ | | 604740K | BTS-470K | |
| R26 | 39K | | 603930K | BTS-39K | |
| R27 | 5600Ω | | 605620K | | |
| R28 | 150Ω | | 603510M | BTS-150 | |
| R29 | 39Ω | | 603900K | BTS-39 | |
| R30 | 220K | | 602240K | BTS-220K | |
| R31 | 1000Ω | | 601020M | BTS-1000 | |
| R32 | 18KΩ | | 601830K | BTS-18K | |
| R33 | 150Ω | | 601510M | BTS-150 | |
| R34 | 56Ω | | 605600K | BTS-56 | |
| R35 | 56K | | 605630K | | |
| R36 | 12K | | 601230K | | |
| R37 | 1000Ω | | 601020M | BTS-1000 | |
| R38 | 220Ω | | 602210K | BTS-220 | |
| R39 | 4700Ω | | 604720K | BTS-4700 | |
| R40 | 18Ω | | 601800K | BTS-18 | |
| R41 | 6800Ω | 2 | 606822K | BTB-6800 | |
| R42 | 6800Ω | 2 | 606822K | BTB-6800 | |
| R43 | 1200Ω | 1 | 601221K | BTA-1200 | |
| R44 | 220KΩ | | 602240K | BTS-220K | |
| R45 | 4700Ω | | 604720K | BTS-4700 | |
| R46 | 4700Ω | | 604720K | BTS-4700 | |
| R47 | 47K | 1 | 604730K | BTA-47K | |
| R48 | 22K | 2 | 602232K | BTB-22K | |
| R49 | 2200Ω | | 602220K | BTS-2200 | |
| R50 | 560Ω | | 605610K | BTS-560 | |
| R51 | 220Ω | | 602210K | BTS-220 | |

Note 1. Not used in s
† Items R67A, R67B, C

## TRANSFORM

| ITEM No. | RATING | | | | METEOR PART No. |
|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | |
| T1 | 117VAC ③ .56A | 6.3V ③ .3A | 6.3V ③ 7.1A | | 80-318 |

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | UHF Oscillator | 6AF4A | |
| V2 | RF Amplifier | 6BK7A | |
| V3 | Mixer-Oscillator | 6U8 | |
| V4 | 1st. Video IF Amplifier | 6CB6 | |
| V5 | 2nd. Video IF Amplifier | 6CB6 | |
| V6 | 3rd. Video IF Amplifier-Video Detector | 6AM8 | |
| V7 | Video Output-Sync Separator | 6AW8 | Note 1 |
| V8 | AGC Keying | 6AU6 | |

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V9 | Sound IF Amplifier-Sync Amplifier | 6U8 | |
| V10 | Ratio Detector-AF Amp.-AGC Clamper | 6T8 | |
| V11 | Audio Output | 6K6GT | |
| V12 | Vert. Osc.-Vert. Output | 12BH7A | |
| V13 | Horiz. AFC-Horiz. Osc. | 6BN7GT | |
| V14 | Horiz. Output | 6AV5GT | |
| V15 | Damper | 6AX4GT | |
| V16 | HV Rectifier | 1B3GT | |

Note 1. 6BH6 may be used in some versions.

## PICTURE TUBE

| ITEM No. | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|
| | METEOR PART No | CBS PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V17 | 17HP4/<br>17RP4 | 17HP4/<br>17RP4 | 17HP4/17RP4 | 17HP4/<br>17RP4<br>17HP4B ② | ① Aluminized<br>② Silver screen "SS" |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | METEOR PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1 | 150 | 150 | 18-323 | AFIS81-70 | XA004 | FP317 | TD-150-150 | T-050 | TVL-1438 |
| C2A | a150 | 150 | 18-323 | E3B397 | XA004 | FP317 | TD-150-150 | T-050 | TVL-1438 |
| B | a50 | 50 | | | BR505 | FP347 | TD-50-50 | FM-0550 | TVA-1308 |
| C3A | a100 | 300 | 18-346 | E4D972 | | FP347 | | D-177 | R2238 * |
| B | a20 | 300 | | | | TC69 | | [illegible] | |
| C | a40 | 300 | | | | | | | |
| D | 20 | 300 | | | | | | | |
| C4 | 20 | 300 | 18-334 | PRS450V20 | BR3038 | TC68 | TD-30-350 | FM-4520 | TVA-1606 |
| C5 | 4 | 50 | 18-339 | PRS150V4 | BR550 | TC30 | TD-4-50 | MMT-0505 | TVA-1303 |

* Non-catalog item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | METEOR PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C6 | 500 | | 18-304 | BPD-0005 | | CG81 | 811-501 | UC-525 | 5GA-T5 | |
| C7 | 500 | | 18-304 | BPD-0005 | | CG81 | 811-501 | UC-525 | 5GA-T5 | |
| C8 | 3.5 | | 8319-501 | | | | | | | |
| C9 | 15 | | 131-150 | N750-DI15 | TCN-15 | N031 | N750K-150 | | 5TCU-Q15 | |
| C10 | 170 | | 137-3 | | | | | | | |
| C11 | 170 | | 136-3 | | | | | | | |
| C12 | 1000 | | 306-102 | KF-001 | MFT-1000 | | | | 503C-D1 | |
| C13 | .01 | | 2101-018 | | | | | | | |
| C14 | 1000 | | 306-102 | KF-001 | MFT-1000 | | | | 503C-D1 | |
| C15 | 470 | | BPD-00047 | BPD-0047 | | KD80 | 811-471 | UC-5347 | 5GA-T47 | |
| C16 | 10 | | 180-100 | N750-KD10 | TCN-10 | TN01 | N750A-100 | NT-541 | 5TCU-Q1 | |
| C17 | 2.7 | | 2101-279 | | | | | | | |
| C18 | 15 | | 131-180 | | TCN-18 | N033 | N750K-180 | | | |
| C19 | 1000 | | 344-1 | | | | | | | |
| C20 | 1000 | | 344-1 | | | | | | | |
| C21 | 1000 | | 344-1 | | | | | | | |
| C22 | 1000 | | 344-1 | | | | | | | |
| C23 | 15 | | 133-180 | NP0-DI15 | TCS-15 | 2G21 | N750K-150 | | 5TCC-Q15 | |
| C24 | 15 | | 133-150 | NP0-DI15 | TCZ-15 | 2G21 | N750K-150 | | 5TCC-Q15 | |
| C25 | 1.2 | | 2101-128 | | | | | | | |
| C26 | 1.5 | | 170-159 | | | | | | | |
| C27 | 10 | | 137-100 | | | | | | | |
| C28 | 1000 | | 344-1 | | | | | | | |
| C29 | 82 | | 159-620 | | TCN-82 | TN17 | N750K-820 | | | |
| C30 | 1000 | | 344-1 | | | | | | | |
| C31 | 1000 | | 344-1 | | | | | | | |
| C32 | 1000 | | 344-1 | | | | | | | |
| C33 | 1000 | | 344-1 | | | | | | | |
| C34 | .22 | 300 | 15-353 | | P288N-23 | | CU3SP22 | | PT4022 | 2TM-P23 |
| C35 | .47 | 200 | 15-340 | | P288N-47 | | CU3SP47 | | PT4047 | 2TM-P47 |
| C36 | 100 | | 15-322 | NP0-DI100 | TCZ-100 | TZ30 | NP0-327-101 | ET-581 | 5TCC-T1 | |
| C37 | 5000 | | 15-320 | BPD-005 | DD-502 | KD69 | 811-005 | DC-525 | 5HK-D5 | |
| C38 | 500 | | 15-320 | DI-00068 | DD-501 | G063 | 811-501 | UC-5356 | 5GA-T56 | |
| C39 | 1000 | | 15-347 | BPD-001 | DD-102 | KD69 | 801-001 | DC-521 | 5HK-D1 | |
| C40A | 1000 | | 15-326 | BPD-2X001 | DD2-105 | DK069 | 812-001 | DCD-521 | 5HK-2D1 | |
| B | 1000 | | | | | | | | | |
| C41 | 1000 | | 15-347 | BPD-001 | DD-102 | KD69 | 801-001 | DC-521 | 5HK-D1 | |
| C42 | 680 | | 15-330 | BPD-00068 | DD-681 | G065 | 811-681 | UC-5368 | 5GA-T68 | |
| C43A | 1000 | | 15-326 | BPD-2X001 | DD2-102 | DK069 | 812-001 | DCD-521 | 5HK-2D1 | |
| B | 1000 | | | | | | | | | |
| C44 | 10 | | 15-324 | NP0-DI10 | TCZ-10 | Z019 | NP0A-100 | ET-541 | 5TCC-Q1 | |
| C45 | 33 | | | | | | | | | |
| C46 | .047 | 400 | 15-345 | BPD-05 | DF-503 | CU3S647 | | FT4147 | 4TM-S47 | |
| C47 | .1 | 400 | 15-364 | P488N-1 | DF-504 | CU34P1 | | FP401 | 4TM-P1 | |
| C48 | .047 | 400 | 15-345 | BPD-05 | DF-503 | CU3S647 | | FT4147 | 4TM-S47 | |
| C49 | 1000 | | 15-347 | BPD-001 | DD-102 | KD69 | 801-001 | DC-521 | 5HK-D1 | |
| C50 | 33 | | | | | | | | | |
| C51A | 5000 | | 15-324 | BPD-005 | DD2-502 | DK079 | 811-005 | DC-525 | 5HK-3D47 | |
| B | 5000 | | | BPD-005 | | | 811-005 | DC-525 | | |
| C52 | 560 | | 15-323 | DI-00056 | DD-561 | G063 | 811-561 | UC-5356 | 5GA-T56 | |
| C53A | 5000 | | 15-324 | BPD-005 | DD2-502 | DK079 | 811-005 | DC-525 | 5HK-3D47 | |
| B | 5000 | | | BPD-005 | | | 811-005 | DC-525 | | |
| C54 | 5000 | | 15-320 | BPD-005 | DD-502 | KD80 | 811-005 | DC-525 | 5HK-D5 | |
| C55 | 5000 | | 15-320 | BPD-005 | DD-502 | KD80 | 811-005 | DC-525 | 5HK-D5 | |
| C56 | 5000 | | 15-320 | BPD-005 | DD-502 | KD80 | 811-005 | DC-525 | 5HK-D5 | |
| C57 | 5000 | 1000 | 15-305 | BPD-5-4700 | DD-502 | KD67 | 181EY-472 | | 103K-D47 | |
| C58 | .022 | 400 | 15-348 | BPD-02 | DF-303 | CU3S622 | 811-03 | | FT4122 | 4TM-S22 |
| C59 | 150 | | 15-326 | NP0-DI150 | TCZ-150 | TZ34 | NP0-334-151 | ET-5315 | 5TCC-T15 | |
| C60 | 12000 | | †17-109 | †PA-501 | †PC-104 | | | | †103C12 | |
| C61 | .0047 | 500 | 15-333 | 1664-0047 | | IR5D47 | | | MS-247 | |
| C62 | 5000 | | 15-320 | BPD-005 | DD-502 | KD80 | 811-005 | DC-525 | 5HK-D5 | |
| C63 | 1 | 600 | 15-308 | P688N-1 | DF-104 | CU3SP1 | | FP601 | 4TM-P1 | |
| C64 | .047 | 400 | 15-347 | BPD-05 | DF-503 | CU3S647 | | FT4147 | 4TM-S47 | |
| C65 | .047 | 200 | 15-366 | BPD-05 | DF-503 | CU3S247 | | FT4167 | 2TM-S47 | |
| C66 | 150 | 500 | 15-300 | NP0-SI150 | TCZ-150 | IR5756 | NP0-334-151 | | MS-315 | |
| C67 | 2000 | | 15-338 | BPD-02 | DD-203 | KD72 | 801-003 | DC-522 | 5HK-D2 | |
| C68 | .047 | 400 | 15-345 | BPD-05 | DF-503 | CU3S647 | | FT4147 | 4TM-S47 | |
| C69 | .022 | 200 | 15-363 | BPD-02 | DF-303 | CU3S623 | 811-02 | | FT4123 | 2TM-S23 |
| C70 | .22 | 300 | 15-353 | P288N-23 | | CU3SP22 | | PT4022 | 2TM-P22 | |
| C71 | 390 | 500 | 15-373 | | D6-391 | SR573B | 811-391 | | MS-339 | |

## CAPACITORS (cont)

| ITEM No | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP | VOLT | METEOR PART No | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No | MALLORY PART No | SPRAGUE PART No | |
| C72 | .01 | 600 | 15-362 | | | 1R5D1 | 811-103 | MCB255 | MH-21 | |
| C73 | 1000 | 500 | 15-336 | | 1484-001 | BPD-0047 | D6-472 | CU3ED47 | 811-0047 | 5TM-D47 |
| C74 | .0047 | 600 | 15-323 | | BPD-05 | DF-503 | CU3S647 | | FT4147 | 4TM-S47 |
| C75 | .047 | 400 | 15-345 | | BPD-05 | DF-503 | CU3S647 | | FT4147 | 4TM-S47 |
| C76 | 47 | | 15-305 | | NP0-D47 | TCZ-47 | Z033 | NP0-338-470 | ZT-5447 | 5TCC-Q47 |
| C77 | 100 | | 15-303 | | NP0-DI100 | TCZ-100 | TZ30 | NP0-337-101 | ZT-531 | 5TCC-T1 |
| C78 | 27 | 4000 | 15-315 | | | DD5C-560 | | 3KV-560 | DC30456 | |
| C79 | 56 | 3000 | | | | | | | | |
| C80 | 5000 | 1000 | 15-326 | | KVD-15-4700 | DD-503 | VD47 | 1R5KV-470 | | 10HK-D47 |
| C81 | 5000 | 1000 | 15-326 | | KVD-15-4700 | DD-503 | VD47 | 1R5KV-470 | | 10HK-D47 |

† Items C80, R67A and R67B are combined in one unit.

## CONTROLS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | METEOR PART No | CENTRALAB PART No | CLAROSTAT PART No | IRC PART No | MALLORY PART No | | |
| R1A | 500KΩ | ½ | A34-531 | B8K-80-S | A47-500K-2 | Q13-135 | U-46 | Volume | |
| B | Shaft | | Not Req. | Not Req. | ES8-3 | Not Req. | Not Req. | Attach to R1A. | |
| C | Switch | | Not Req. | Not Req. | SWE-12 | 76-1 | US-26 | Attach to R1A. | |
| R2A | 200Ω | ½ | A35-61 | A47-200-S | A47-500-S | Q11-301 | U-3 | Contrast | |
| B | Shaft | | Not Req. | AK-4 | ES8-3 | Not Req. | Not Req. | Attach to R2A. | |
| R3A | 3Meg with 800K stop | ½ | A35-5D | a4A43-3Meg-S | a4A43-3Meg-S | a Q11-339 | a U-355 | Vert. Hold | |
| B | Shaft | | Not Req. | AK-4 | ES8-3 | Not Req. | Not Req. | Attach to R3A. | |
| R4A | 500Ω | ½ | A35-62 | AB-21 | A47-50K-S | Q11-123 | U-35 | Horiz. Hold | |
| B | Shaft | | Not Req. | AK-4 | ES8-3 | Not Req. | Not Req. | Attach to R4A. | |
| R5A | 100KΩ | ½ | A35-63 | AB-40 | A47-100K-S | Q11-139 | Not Req. | Brightness | |
| B | Shaft | | Not Req. | AK-1 | FKS-½ | RQ | Not Req. | Attach to R5A. | |
| R6A | 3Meg with 1Meg stop | ½ | † A35-65 | † AB-86 | †A47-4Meg-S | † Q11-141 | † TA56L | Height | |
| B | Shaft | | Not Req. | AK-1 | FKS-½ | RQ | Not Req. | | |
| R7A | 5000Ω with 1000Ω stop | ½ | A35-53 | * AB-9 | *A47-4000-S | * Q11-114 | * PTA-3521 | Vert. Linearity | |
| B | Shaft | | Not Req. | AK-19 | ES8-3 | TQ | Not Req. | Attach to R7A. | |

* Connect an 820KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).

† Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).

* Connect a 180Ω resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | METEOR PART No. | IRC PART No. | |
| R8 | 470K | | 604740M | BTS-470K | |
| R9 | 470K | | 604740M | BTS-470K | |
| R10 | 6800Ω | | 106-682 | BTS-6800 | |
| R11 | 1000Ω | | 106-102 | BTS-1000 | |
| R12 | 150 | | 106-151 | BTS-150 | |
| R13 | 150K | | 106-154 | BTS-150K | |
| R14 | 330K | | 106-334 | BTS-330K | |
| R15 | 5600Ω | | 106-562 | BTS-5600 | |
| R16 | 750K | | 106-754 | BTS-750K 5% | |
| R17 | 1Meg | | 106-105 | BTS-1Meg | |
| R18 | 15KΩ | | 106-153 | BTS-15K | |
| R19 | 3900Ω | 1 | 107-392 | BTA-3900 | |
| R20 | 22KΩ | | 106-223 | | |
| R21 | 470K | | 106-474 | BTS-470K | |
| R22 | 680Ω | | 106-681 | BTS-680 | |
| R23 | 4700Ω | | 106-472 | BTS-4700 | |
| R24 | 120KΩ | | 106-124 | BTS-120K | |
| R25 | 470KΩ | | 604740K | BTS-470K | |
| R26 | 39K | | 603930K | BTS-39K | |
| R27 | 5600Ω | | 606300M | BTS-5600 | |
| R28 | 150Ω | | 603510M | BTS-150 | |
| R29 | 39Ω | | 603900M | BTS-39 | |
| R30 | 220K | | 602240K | BTS-220K | |
| R31 | 1000Ω | | 601020M | BTS-1000 | |
| R32 | 18KΩ | | 601830K | BTS-18K | |
| R33 | 150Ω | | 601510M | BTS-150 | |
| R34 | 56Ω | | 605600K | BTS-56 | |
| R35 | 56K | | 605630K | | |
| R36 | 12K | | 601230K | | |
| R37 | 1000Ω | | 606300M | BTS-1000 | |
| R38 | 220Ω | | 602210K | BTS-220 | |
| R39 | 4700Ω | | 604730K | BTS-4700 | |
| R40 | 18Ω | | 606180K | BTS-18 | |
| R41 | 6800Ω | 2 | 606822K | BTB-6800 | |
| R42 | 6800Ω | 2 | 606822K | BTB-6800 | |
| R43 | 1200Ω | 1 | 601231K | BTA-1200 | |
| R44 | 220KΩ | | 602240K | BTS-220K | |
| R45 | 4700Ω | | 604730K | BTS-4700 | |
| R46 | 4700Ω | | 604720K | BTS-4700 | |
| R47 | 47K | 1 | 604730K | BTA-47K | |
| R48 | 22K | 2 | 602232K | BTB-22K | |
| R49 | 2200Ω | | 602220K | BTS-2200 | |
| R50 | 56Ω | | 606560K | BTS-560 | |
| R51 | 220Ω | | 602210K | BTS-220 | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | METEOR PART No. | IRC PART No. | |
| R52 | 22KΩ | | 602230M | BTS-22K | |
| R53 | 18KΩ | | 601830K | BTS-18K | |
| R54 | 3.3Meg 5% | | 603350J | BTSJ-3Meg5% | |
| R55 | 4.7Meg | | 604750M | BTS-4.7Meg | |
| R56 | 270K | | 602740K | BTS-270K | |
| R57 | 470K | | 604740M | BTS-470K | |
| R58 | 330Ω | 1 | 60331K | BTA-330 | |
| R59 | 1000Ω | 2 | 601021M | BTB-1000 | |
| R60 | 15KΩ | | 601530M | BTS-15K | |
| R61 | 270K | | 602740K | BTS-270K | |
| R62 | 2.2Meg | | 602250K | BTS-2.2Meg | |
| R63 | 680K | | 606840K | BTS-680K | |
| R64 | 1800Ω | | 601802K | BTS-1800 | |
| R65 | 2200Ω | | 602202K | BTS-2200 | |
| R66 | 470K | | 604730K | BTS-470K | |
| R67A | 3.5K 4K | | † 17-109 | | |
| B | | | | | |
| R68 | 1Meg | | 601050M | BTS-1Meg | |
| R69 | 2.2Meg | | 602250M | BTS-2.2Meg | |
| R70 | 560Ω | | | | |
| R71 | 560Ω | | | | |
| R72 | 68KΩ | 1 | 606831K | BTA-68K | |
| R73 | 330K | 1 | 60341K | BTA-330K | |
| R74 | 820K | | 602840K | | |
| R75 | 2.7Meg | 1 | 607275K | | |
| R76 | 150K | 1 | 60354K | | |
| R77 | 8200Ω | 1 | 608230K | | |
| R78 | 100K | 1 | 60044K | | |
| R79 | 150K | 1 | 60354K | | |
| R80 | 82000Ω | | 608230K | | |
| R81 | 39K | 1 | 603931K | BTA-39K | |
| R82 | 10K | | 601030K | | |
| R83 | 180K | | 601804K | | |
| R84 | 270K | | 602740K | | |
| R85 | 10KΩ | 2 | 601032K | | |
| R86 | 100K | | 601043K | | |
| R87 | 39Ω | 1 | | | |
| R88 | 2.5Ω | | 60-973 | BW-2.2 | |
| R89 | 1000Ω | | 601030M | | |
| R90 | 140Ω | 10 | 61-2 | 1 3/4A-150 | |
| R91 | 470Ω | 1 | 604711K | BTA-470 | |
| R92 | 2200Ω | 15 | 61-7 | | |
| R93 | 7.5Ω | 5 | 43D07 | | |
| R94 | 470K | | 604740M | BTS-470K | |

Note 1. Not used in some versions.
† Items R67A, R67B, C80 are combined in one unit.

## TRANSFORMER (FILAMENT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | METEOR PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 117VAC | 6.3V @ .56A | 6.3V @ .3A | 7.1A | 80-319 | | | | | |

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No. | USE | REPLACEMENT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | METEOR PART No | Halldorson PART No | Merit PART No | RCA TYPE No | Ram PART No | Stancor PART No | Thordarson PART No | Triad PART No |
| T2 | Vert. Osc. Trans. | 80-328 | B6703 | A-3002 | 30VT1 ① | V406 | A-8125 | 26A03 | A-97X |
| T3 | Horiz. Output Trans. | 80-328D ② 80-326 ② | | RVO-40 & MWC-1 * | | | | | |
| T4 | Vert. Output Trans. | 80-325 | Z1806 ① | A-3039 ① | 225T1 ① | V312 ① | A-8141 ① | 26G54 ① | A-104X ① |
| T5A | Yoke (34MM) | 10-602 ② | DF608 ② | MDY-75 | 22SD1 ② | Y70Y25 ② | DY-15A ② | Y-10 ② | A-101-1 ② |
| B | Vert. (35MM) | 10-699 ② | | 5 & 8 | | | | | |

① Drill new mounting hole(s).
② Alternate Meteor part number.
③ Includes rear cover and centering device; capacitor C78; resistors R70, R71, and R88.
④ Connect horizontal damping network across terminals #3 and #7. Use original if necessary.
⑤ Use original rear cover and centering device.
⑥ Use original horizontal yoke damping network if necessary.

PROPERTY OF L. F. BLANKENSHIP 2[illegible] ST. [illegible]

## *HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

| ORIGINAL TERMINAL CONNECTIONS | Halldorson Replacement Connections | Merit Replacement Connections | RCA Replacement Connections | Ram Replacement Connections | Stancor Replacement Connections | Thordarson Replacement Connections | Triad Replacement Connections |
|---|---|---|---|---|---|---|---|
| 4 | | 4 | | | | | |
| 3 | | 3 | | | | | |
| 2 | | 2 | | | | | |
| 1 | | 1 | | | | | |
| A | | Red Term. of MWC-1 | | | | | |
| G | | Blue Term. of MWC-1 | | | | | |
| Coil Across | | Orange & Blk. Terms. of MWC-1 Across 2 & 1 | | | | | |
| Special Notes | | 7 | | | | | |

③ If AGC does not function properly, reverse width coil primary or secondary.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No | IMPEDANCE | | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC | METEOR PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T6 | 5.7KΩ | 3-4Ω | 80-319 | Z1004 L | A2950 L | A3850 L | 24S51 L | S-6X L | Drill one new mtg. hole. |

## SPEAKER

| ITEM No. | RATINGS | | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V C IMP. | | METEOR PART No. | RCA TYPE No | |
| SP1 | 4" | PM | 3-4Ω | | B79-429 | 4AD7 | 223B1 |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | METEOR PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | RF Choke | 1.5Ω | | 181-10 | | | | |
| L2 | UHF IF Coil | 0Ω | | 1785-13 | | | | |
| L3 | VHF Ant.Trap | 0Ω | | 5393-1 | | | | |
| L4 | UHF RF Coil | 0Ω | | 302-18 | | | | |
| L5 | Fil. Choke | 0Ω | | 301-8 | | | | |
| L6 | Neut. Coil | 0Ω | | 301-7 | | | | |
| L7 | VHF RF Coil | 0Ω | | 301-10 | | | | Channel 13 |
| L8 | VHF RF Trans | 0Ω | 0Ω | 5380-1 | | | | |
| L9 | VHF RF Trans | 0Ω | 0Ω | 5380-3 | | | | |
| L10 | VHF Mixer | | | | | | | |
| | Grid Coil | 0Ω | | 301-5 | | | | Channel 13 |
| L11 | Fil. Choke | 0Ω | | 301-9 | | | | |
| L12 | VHF Osc. Coil | 0Ω | | 5381-1 | | | | Channel 13 |
| L13 | VHF Osc. Coil | 0Ω | | 5381-3 | | | | Channel 6 |
| L14 | RF Coil | 0Ω | | 301-1 | | | | |
| L15 | Conv. Plate | .2Ω | | 5359-5 | | | | |
| L16 | 1st Video IF | .1Ω | | 10-680 | | | | Includes 41.25MC Trap |
| L17 | 2nd Video IF | .1Ω | .1Ω | 10-677 | 17-5003 | TV-125 | 6233 | Includes 47.25MC Trap |
| L18 | 3rd Video IF | .1Ω | .1Ω | 10-678 | 17-5000 | TV-125 | 6234 | |
| L19 | 4th Video IF | .1Ω | .1Ω | 10-679 | 17-5004 | TV-125 | 6234 | |
| L20 | RF Coil | .1Ω | | 10-697 | | | | .6 Microhenries |
| L21 | Series Peaking Coil | 9Ω | | 10-676 | 19-3125 | | 6183 | 150 Microhenries |
| L22 | Shunt Peaking Coil | 13Ω | | 10-680 | 19-3320 | TV-185 | 6180 | 249 Microhenries |
| L23A | 4.5MC Trap | 5.5Ω | | 10-674 | | | | |
| B | Sound IF | 5.3Ω | | | | | | |
| L24 | Series Peaking Coil | 10.5Ω | | 10-671 | 19-4320 | TV-185 * | 6173 | 220 Microhenries; Wound on 22K Ω resistor |
| L25 | Shunt Peaking Coil | 10.5Ω | | 10-609 | 19-2220 | TV-185 | 6184 | 220 Microhenries |
| L26 | Ratio Det. | 4Ω | 1.6Ω | 10-689 * | 17-3497 | TV-115 | 6305 | Tertiary Winding, 8Ω |

* Alternate Part No. 10-716.
* Parallel with 22KΩ resistor.

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC | METEOR PART No | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | RCA TYPE No. | Ram PART No. | Thordarson PART No. | |
| L27 | 22Ω | 5Ω | 10-690 | 30-1403 * | TV-185 * | 6183 * | 30SR1 * | H-100 * | HS-3 * | Waveform Winding-44Ω |

* Reverse coil mounting in can.

## SELENIUM RECTIFIER

| ITEM No | RATING | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | CURRENT | METEOR PART No | FEDERAL PART No | INTERNATIONAL PART No | MALLORY PART No | RADIO RECEPTOR PART No | SARKES TARZIAN PART No. | |
| M1 | .220A | 83-829 | 1236A | MR300 | 6S300 | 6Q4 | 300 | |
| M2 | .220A | 83-829 | 1236A | MR300 | 6S300 | 6Q4 | 300 | |

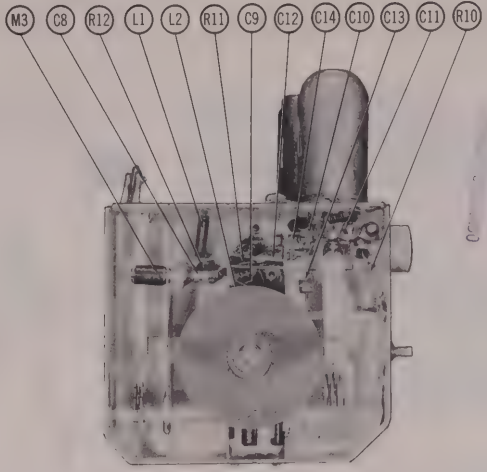
# PARTS LIST AND DESCRIPTIONS (Continued)

## CRYSTAL DIODES

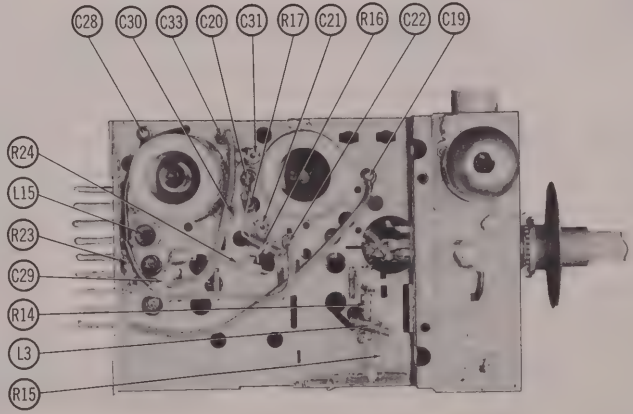
| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|
| | | METEOR PART No. | SYLVANIA PART No. | |
| M3 | ST-47 | 48-99 | 1N82 or 1N82A | UHF Mixer (Clip in) |

## MISCELLANEOUS

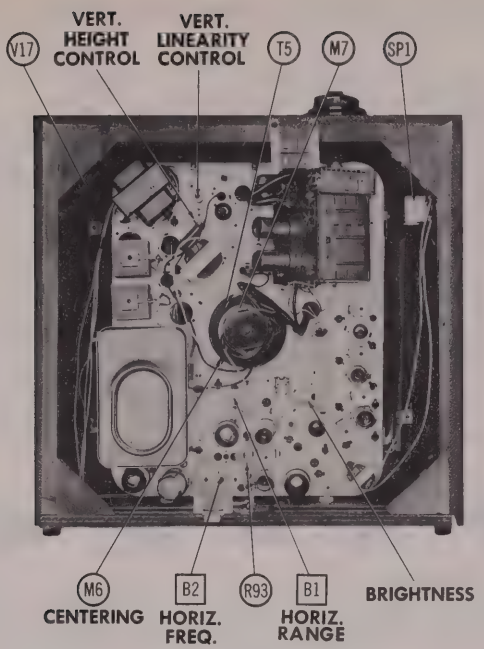
| ITEM No. | PART NAME | METEOR PART No. | NOTES |
|---|---|---|---|
| M4 | Dial Light | 89-7 | #47 |
| M5 | Tuner | 95-63 | VHF-UHF Combination, Consists of VHF Section Part #95-68, and UHF Section Part #95-65 |
| M6 | Centering Device | | Part of Deflection Yoke (T5) Rear Cover |
| M7 | Ion Trap | 83-830 | |
| B1 | Trimmer Cap. | 20-152 | Horiz. Range ( 25-280MMF) |




**UHF TUNER FRONT VIEW**




**RF TUNER TOP VIEW**




CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.

2. Turn the horizontal range (B1) fully clockwise. Set the horizontal hold control to mid-range position.

3. Adjust the horizontal frequency slug (B2) until the picture synchronies horizontally.

4. Connect the vertical appilfier of the oscilloscope thru a low capacity probe to point ⊗.

5. Adjust the waveform slug (B3) until the waveform obtained on the scope is similar to Fig. 4 with the sharp peak 10% higher in amplitude than the broad peak. During this adjustment, keep the picture in sync by adjusting the horizontal hold control and the horizontal frequency slug (B2).

6. Turn the horizontal hold control fully counter clockwise. Momentarily interrupt the signal by switching off channel and back again. The picture may remain in sync. If so, turn B2 counter clockwise until the picture will no longer pull into sync when the signal is interrupted momentarily. Then turn B2 clockwise until the picture just falls into sync.

7. Turn the horizontal hold control fully clockwise. Again, momentarily interrupt the signal by switching off channel and back again. The picture should pull into sync. If not, turn the horizontal range control (B1) counter clockwise until the picture does remain in sync during interruption.

8. Repeat steps 6 and 7 until proper action is obtained. B1 and B2 are properly adjusted when the picture will remain in sync at both extreme settings of the horisontal hold control when the signal is momentarily interrupted.

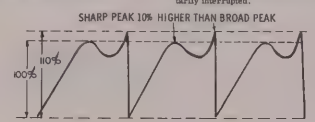
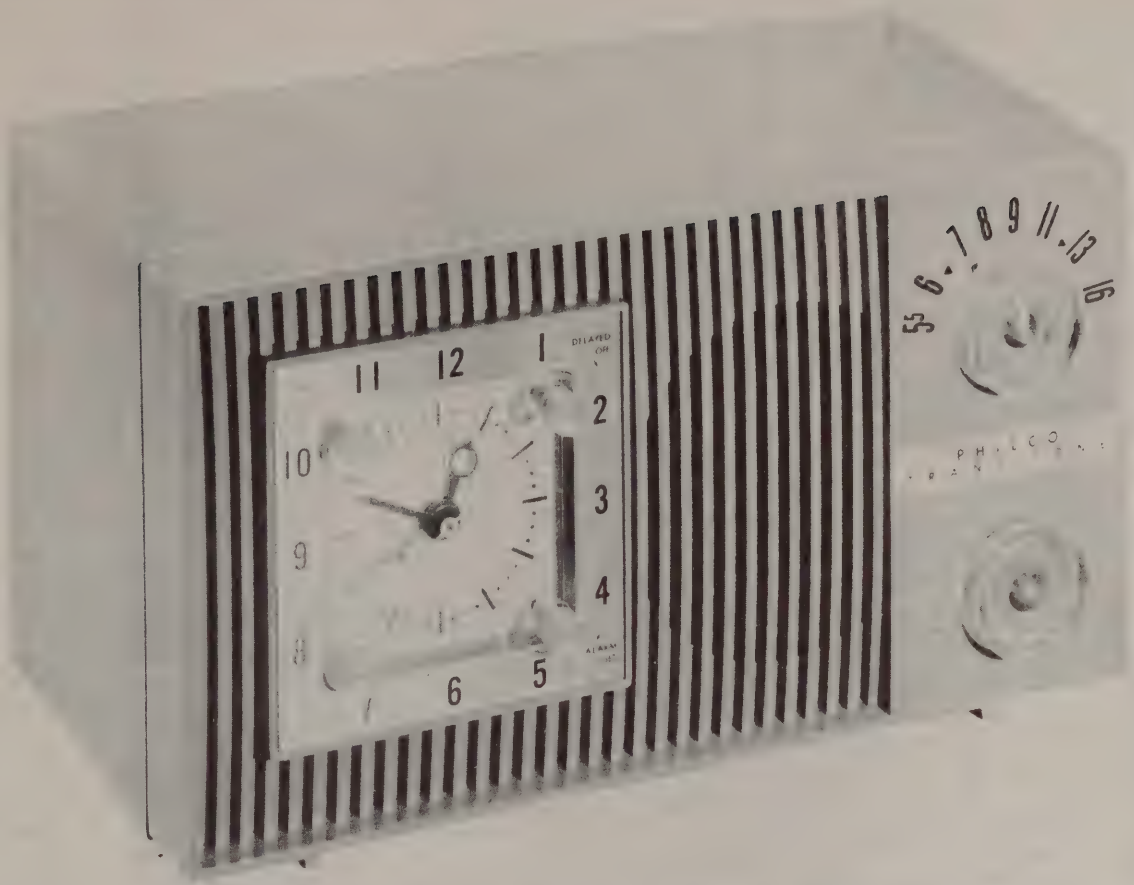



FIG. 4

PHILCO MODELS D-579, D-590, D-591, D-717, D-719, D-726



PHILCO MODELS D-579, D-590, D-591, D-717, D-719, D-726

| | |
|---|---|
| TRADE NAME | Philco Models D-579, D-590, D-591 (Without Clock); D-717, D-719, D-726 (With Clock) |
| MANUFACTURER | Philco Corp., Tioga & "C" Sts., Philadelphia, Pa. |
| TYPE SET | AC Operated AM Superheterodyne Receiver with Electric Clock |
| TUBES (Four) | Types 12AU6 Converter, 12AV6 Det.-AF Amp., 50C5 Output, 35W4 Rectifier |
| POWER SUPPLY | 105-120 Volts AC-60 Cycles — RATING .21 Amp. @ 117 Volts AC |
| TUNING RANGE—BROADCAST | 540KC-1620KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to antenna lug on tuning gang. Low side to B-. | 455KC (400~ Mod.) | Tuning gang fully open | Across Voice Coil | A1, A2 | Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation. |
| 2. | | Loop | 1620KC | " | " | A3 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 3. | | " | 1400KC | Tune to 1400KC signal | " | A4 | " |
| 4. | | " | 580KC | Tune to 580KC signal | " | A5 | Adjust for maximum output while rocking tuning gang. |

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# PARTS LIST AND DESCRIPTIONS
## TUBES ( GENERAL ELECTRIC, SYLVANIA )

PHILCO MODEL D-579

# PARTS LIST AND DESCRIPTIONS (Continued)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | Converter | 12AU6 | |
| V2 | Det. -AF Amp. | 12AV6 | |
| V3 | Output | 50C5 | |
| V4 | Rectifier | 35W4 | |

## SPEAKER

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | PHILCO PART No. | QUAM PART No. | RCA TYPE No. | |
| SP1 | 4" | PM | 3-4Ω | 36-1655 | 4A07 | 223S1 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | PHILCO PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | 30 | 150 | 30-2585-2 | AFH3-08 | C008 | FP311.4 | TMT-8 | T-035 | TVL-3437 |
| B | ▲ 25 | 150 | | | | | | | |
| C | ■ 20 | 150 | | | | | | | |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | PHILCO PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | 47 | | 30-1230-4 | SI47 | D6-470 | TP29 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C3 | 2. 2 | | 30-1221-6 | NPO-SI2. 2 | TCZ-2R2 | TZ05 | NPOA-2R2 | | 5TCCB-V22 | |
| C4 | 12 | | 30-1224-102 | | | | | | | |
| C5 | . 05 | 200 | 30-4650-45 | BPD-05 | BPD-05 | | | PT415 | 2TM-S5 | |
| C6 | 47 | | 30-1230-4 | SI47 | D6-470 | TP29 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C7 | 5000 | | 30-1238-1 | BPD-005 | DD-502 | K-80 | 811-005 | DC-525 | 5HK-D5 | |
| C8A | 5000 | | | | | | | | | |
| B | 250 | | ♦ 30-6001 | ♦ PA-305 | ♦ PC-70 | ♦ 112TM1 | ♦ 1406-01 | | ♦ T-3 | |
| C | | | | | | | | | | |
| C9 | 100 | | 30-1224-130 | SI100 | D6-101 | TP34 | GP1K-101 | UC-531 | 5GA-T1 | |
| C10 | . 02 | 400 | 30-4650-60 | BPD-02 | DD-203 | CUB4S2 | 817-02 | PT412 | 4TM-S2 | |
| C11 | . 047 | 400 | 30-4650-45 | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |

♦ Items C8A, C8B, C8C, R5A and R5B are combined in one unit. When replacing items separately, C8B and C8C should total 250MMF.

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESIST-ANCE | WATTS | PHILCO PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1 | 2Meg | ½ | 33-5575-1 | | | | | Volume |
| | 2Meg | ½ | 33-5575 | | | | | Volume & Switch (Note 1) |

Note 1. Used in Models D-579, D-590 and D-591 only.

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | PHILCO PART No. | IRC PART No. | |
| R2 | 2. 2Meg | | 66-5228340 | BTS-2. 2Meg | |
| R3 | 2200Ω | | 66-2228340 | BTS-2200 | |
| R4 | 10Meg | | 66-6108340 | BTS-10Meg | |
| R5A | 500K | | ♦30-6001 | BTS-470K | |
| B | 500K | | | BTS-470K | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | PHILCO PART No. | IRC PART No. | |
| R6 | 150Ω | | 66-1158340 | BTS-150 | |
| R7 | 220Ω | 1 | 66-1224340 | BTA-220 | |
| R8 | 1000Ω | | 66-2108340 | BTS-1000 | |
| R9 | 880Ω Cold | | 33-1343-6 | | Note 1 |
| | 50Ω Hot | | | | |

Note 1. Temperature compensating resistor.
♦ Items R5A, R5B, C8A, C8B, C8C are combined in one unit.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | PHILCO PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 2.2KΩ | 3-4Ω | 32-8384-2 | Z1101 | A-3025 | A-3332 | 26S58 | S-12X | |

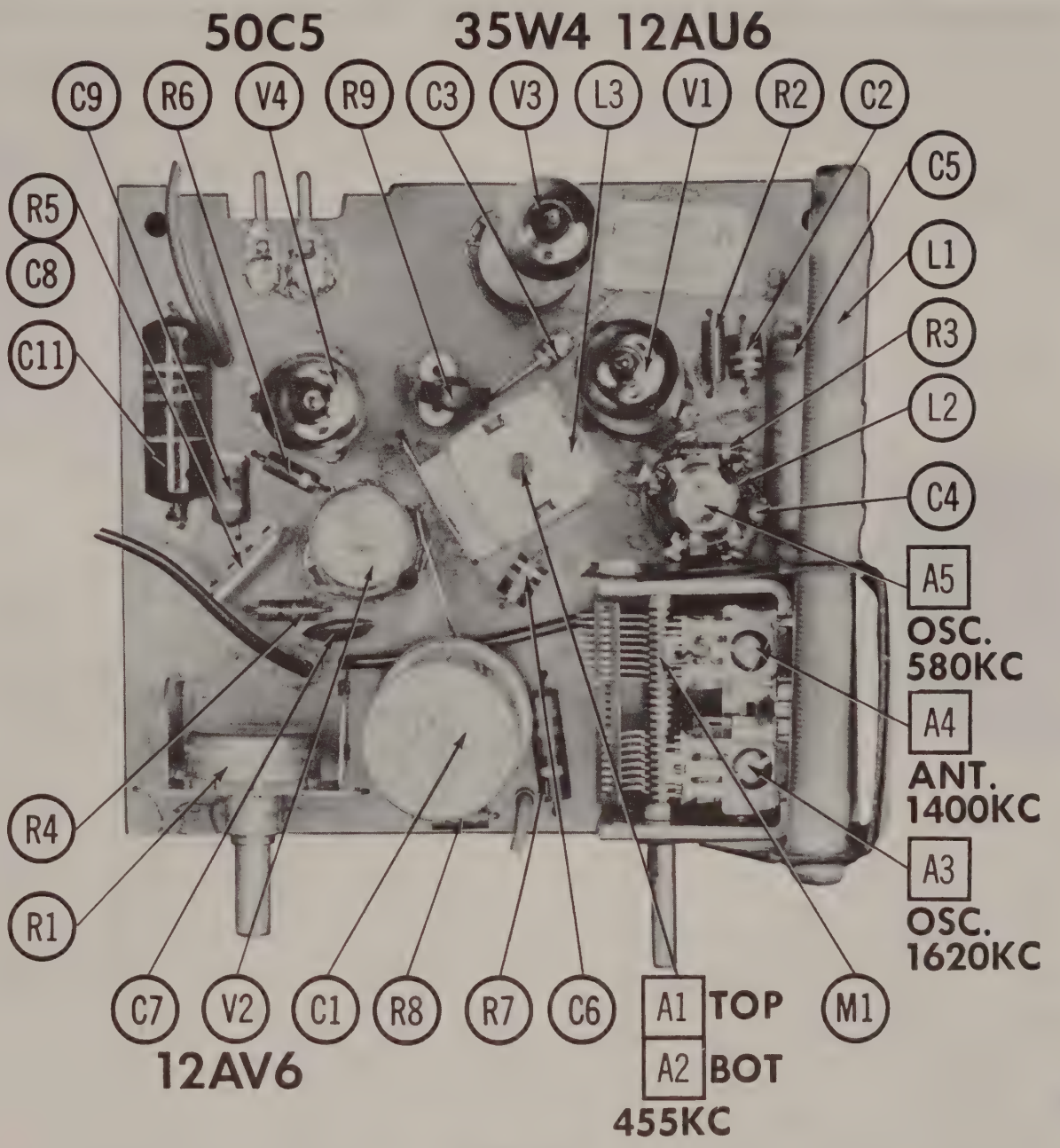
## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | PHILCO PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Loop Stick | . 7Ω | | 76-9228 | | | | Used in Models D-717, D-719 (Note 1) |
| L2 | Osc. Coil | 1. 1Ω | 4. 5Ω | 32-4626 | | | | Used in Models D-579, D-717 and D-719 (Note 2) |
| L3 | IF Trans. | 35Ω * | 34Ω | 32-4627-1 | | | | * Tapped ③ 1Ω |

Note 1. Part No. 76-9228-2 used in Models D-579, D-580, D-581 and D-726.
Note 2. Part No. 32-4626-1 used in Models D-590 , D-591 and D-726.

## MISCELLANEOUS

| ITEM No. | PART NAME | PHILCO PART No. | NOTES |
|---|---|---|---|
| M1 | Tuning Cap. | 31-2780 | 2 Gang |
| M2 | Clock | 41-2048-4 | Model D-717 |
| | Clock | 41-2048-9 | Model D-719 |
| | Clock | 41-2048-3 | Model D-726 First Production |
| | Clock | 41-2057 | Model D-726 Later Production |
| | Cabinet | 11063 | Model D-579 |
| | Cabinet | 11063-4 | Model D-590 |
| | Cabinet | 11063-3 | Model D-591, Cherry |
| | Cabinet | 11063-2 | Model D-591, Ivory |
| | Cabinet | 11063-5 | Model D-591, Lime |
| | Cabinet | 11062 | Model D-717 |
| | Cabinet | 11062-3 | Model D-719, Ivory |
| | Cabinet | 11062-4 | Model D-719, Old Rose |
| | Cabinet | 11062-2 | Model D-719, Spruce Green |
| | Cabinet | 11062-5 | Model D-719, Ebony |
| | Knob | 54-6156 | Tuning, Model D-579 |
| | Knob | 54-6156-6 | Tuning, Model D-590 |
| | Knob | 54-6156-7 | Tuning, Model D-591 |
| | Knob | 54-6156-2 | Tuning, Model D-717 |
| | Knob | 54-6156-4 | Tuning, Model D-719 |
| | Knob | 54-6156-10 | Tuning, Model D-726 |
| | Knob | 54-6159 | Volume, Model D-579 |
| | Knob | 54-6159-6 | Volume, Model D-590 |
| | Knob | 54-6159-7 | Volume, Model D-591 |
| | Knob | 54-6156-3 | Volume, Model D-717 |
| | Knob | 54-6156-5 | Volume, Model D-719 |
| | Knob | 54-4773-22 | Volume, Model D-726 |
| | Knob | 54-6096-3 | Clock (2 used), Models D-717, D-719, D-726 |
| | Dial Scale | 28-10231 | Model D-579 |
| | Dial Scale | 28-10231-1 | Models D-590, D-591 |
| | Crystal | 54-5208 | Clock, Models D-717, D-726 |
| | Crystal | 54-5208-1 | Clock, Model D-719 |
| | Face | 28-10034-2 | Clock, Used with Clock Part No. 41-2048-3 |
| | Face | 28-10904 | Clock, Used with Clock Part No. 41-2057 |




CHASSIS TOP VIEW

PHILCO
MODEL D-579

PROPERTY OF
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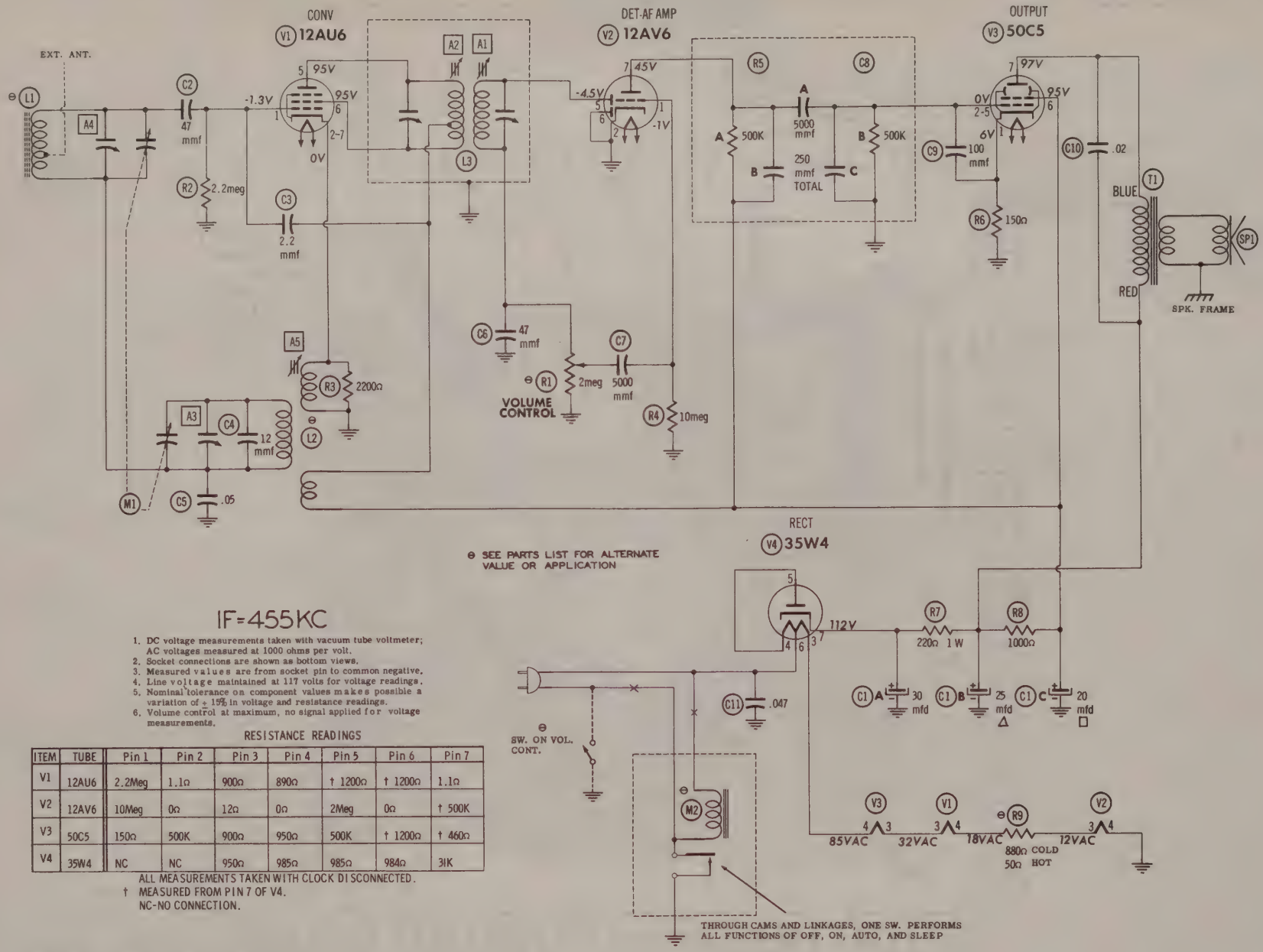
3944 ALTADE ST.
DENVER, COLORADO




⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

## IF=455KC

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 12AU6 | 2.2Meg | 1.1Ω | 900Ω | 890Ω | † 1200Ω | † 1200Ω | 1.1Ω |
| V2 | 12AV6 | 10Meg | 0Ω | 12Ω | 0Ω | 2Meg | 0Ω | † 500K |
| V3 | 50C5 | 150Ω | 500K | 900Ω | 950Ω | 500K | † 1200Ω | † 460Ω |
| V4 | 35W4 | NC | NC | 950Ω | 985Ω | 985Ω | 984Ω | 3IK |

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
† MEASURED FROM PIN 7 OF V4.
NC-NO CONNECTION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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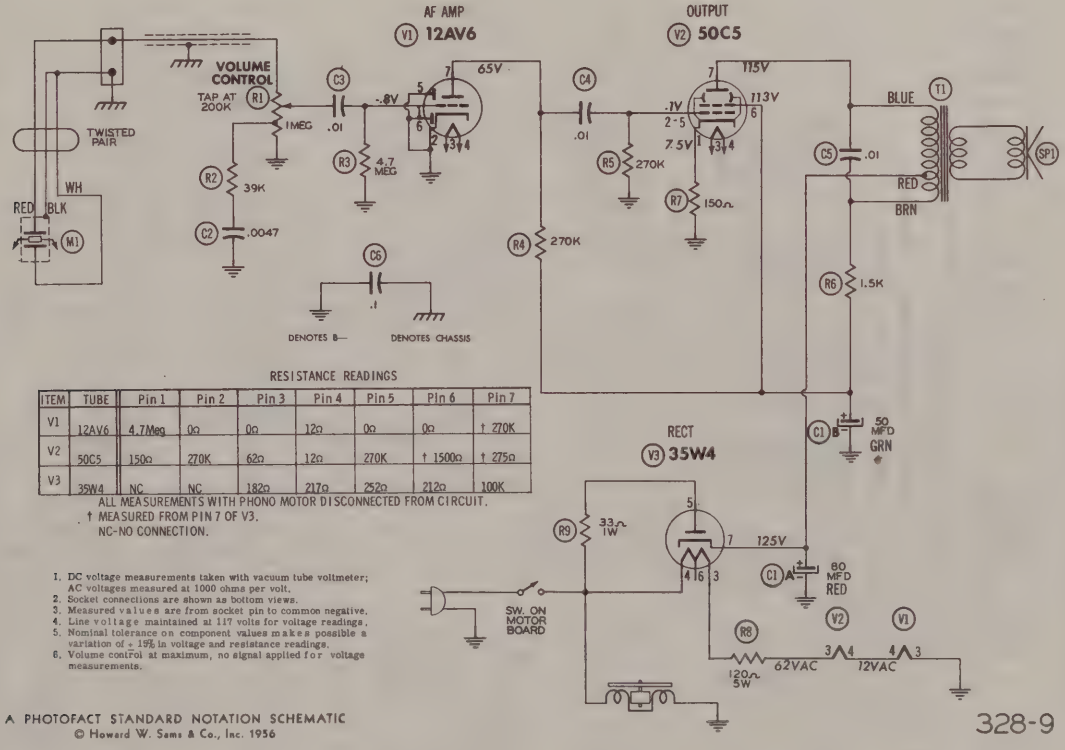
RCA VICTOR
MODEL 6-EY-2 (Ch. RS-136J)

PR... OF
L. F. ...SHIP
3... ST.
DENVER, COLORADO

RCA VICTOR
MODEL 6-EY-2 (Ch. RS-136J)

| | |
|---|---|
| TRADE NAME | RCA Victor Model 6-EY-2 (Ch. RS-136J) |
| MANUFACTURER | RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 8, N.J. |
| TYPE SET | AC Operated Phono Amplifier with 45RPM Automatic Record Changer |
| TUBES (Three) | Types 12AV6 AF Amplifier, 50C5 Output, 35W4 Rectifier |
| POWER SUPPLY | 110-120 Volts AC-60 Cycles RATING .24 Amp. @ 117 Volts AC |

FOR SERVICE INFORMATION ON RECORD CHANGER—SEE RCA MODEL RP-190 SERIES—PHOTOFACT SET #144—FOLDER #7 OR RECORD CHANGER MANUAL CM-4.




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 12AV6 | 4.7Meg | 0Ω | 0Ω | 12Ω | 0Ω | 0Ω | † 270K |
| V2 | 50C5 | 150Ω | 270K | 62Ω | 12Ω | 270K | † 1500Ω | † 275Ω |
| V3 | 35W4 | NC | NC | 182Ω | 217Ω | 252Ω | 212Ω | 100K |

ALL MEASUREMENTS WITH PHONO MOTOR DISCONNECTED FROM CIRCUIT.
† MEASURED FROM PIN 7 OF V3.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | AF Amplifier | 12AV6 | |
| V2 | Output | 50C5 | |
| V3 | Rectifier | 35W4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | RCA Victor PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | 80 | 150 | 75980 | PRS150V4080 | BBRD8415 | TCD498 | TDLD-12 | FMT-1540 | TVA-3451 |
| B | 50 | 150 | | | | | | | |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | RCA Victor PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | .0047 | 400 | 73920 | SI4700 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C3 | .01 | 200 | 79014 | BPD-01 | D6-103 | CUB4SI | GP3-333-103 | PT411 | 4TM-SI | |
| C4 | .01 | 200 | 79014 | BPD-01 | D6-103 | CUB4SI | GP3-333-103 | PT411 | 4TM-SI | |
| C5 | .01 | 400 | 73561 | BPD-01 | D6-103 | CUB4SI | GP3-333-103 | PT411 | 4TM-SI | |
| C6 | .1 | 400 | 73551 | P488N-1 | DF-104 | CUB4P1 | | PT401 | 4TM-P1 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | RCA Victor PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 1Meg | ½ | 38407 | BT-72 | A47F-1Meg | Q13-137X | UT-440 | Volume -Tap at 200K |
| B | Shaft | | Not Req. | Not Req. | FS-3 | Not Req. | Not Req. | Attach to R1A. |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | RCA Victor PART No. | IRC PART No. | |
| R2 | 39K | | 502339 | BTS-39K | |
| R3 | 4.7Meg | | 30931 | BTS-4.7Meg | |
| R4 | 270K | | 502427 | BTS-270K | |
| R5 | 270K | | 502427 | BTS-270K | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | RCA Victor PART No. | IRC PART No. | |
| R6 | 1500Ω | | 502215 | BTS-1500 | |
| R7 | 150Ω | | 502115 | BTS-150 | |
| R8 | 120Ω | 5 | 72314 | 1 3/4A-125 | |
| R9 | 33Ω | 1 | 512033 | BTA-33 | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | RCA Victor PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 2.8KΩ | 3.2Ω | 75939 | Z1102 ① | A-3031 ① | A-3336 ① | 24S50A ① | S-16X | ① Drill one new mounting hole. |

## SPEAKER

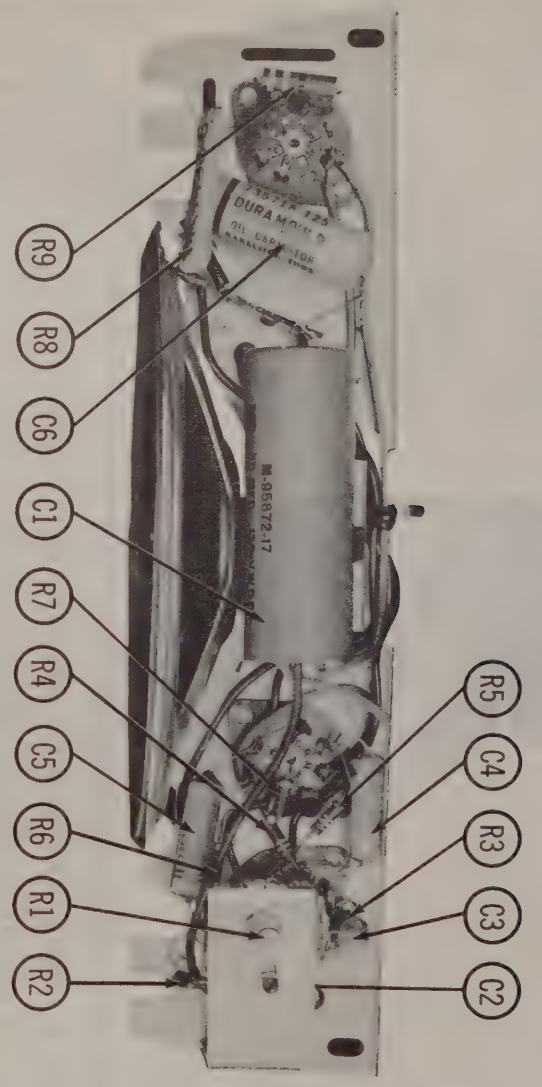
| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | RCA Victor PART No. | QUAM PART No. | RCA TYPE No. | |
| SP1 | 4"x 6" | PM | 3.2Ω | 76407 | 46A07 | 246S2 | |

## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA | | | | | REMARKS |
|---|---|---|---|---|---|---|
| | RCA Victor PART No. | ASTATIC PART No. | | ELECTRO-VOICE PART No. | | |
| | | CARTRIDGE | NEEDLE | CARTRIDGE | NEEDLE | |
| M1 | 74067 | 408 | (N-10-1J) | 44 | (0-1 or S-1) | |

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

# CHASSIS—BOTTOM VIEW

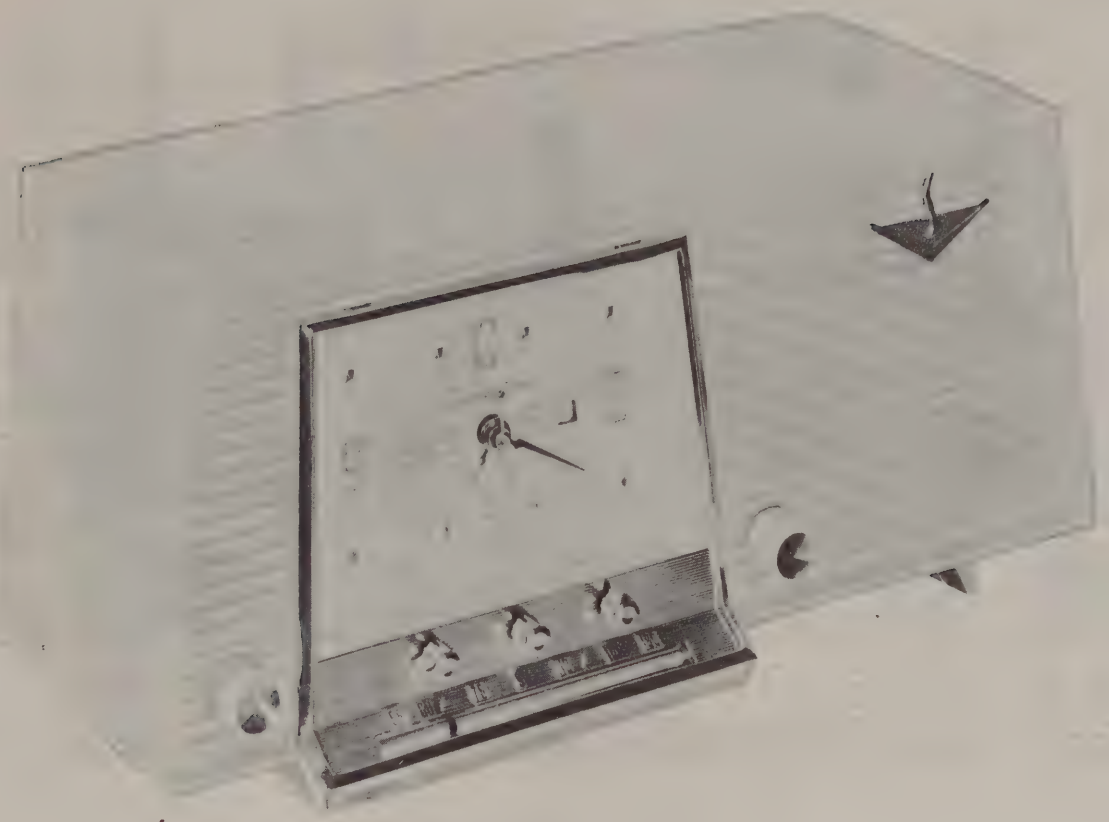



## PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

| ITEM No. | REPLACEMENT DATA | | | | REMARKS |
|---|---|---|---|---|---|
| | RCA Victor PART No. | JENSEN PART No. | PERMO PART No. | WALCO PART No. | |
| M2 | 74068 | * M-7LLP or † M-70LP or ♦ M-70LPD | † A-396 or ♦ A-396D | † W-42MGS or ♦ W-42MGD | * Metal<br>† Jewel<br>♦ Diamond |

SILVERTONE MODELS
6025, 6026 (Ch. 528.40400)



SILVERTONE MODELS
6025, 6026 (Ch. 528.40400)

| | |
|---|---|
| TRADE NAME | Silvertone Models 6025, 6026 (Ch. 528. 40400) |
| SUPPLIER | Sears Roebuck & Co., 925 S. Homan, Chicago, Ill. |
| TYPE SET | AC Operated AM Superheterodyne Receiver with Electric Clock |
| TUBES (Six) | Types 6BJ6 RF Amplifier, 12BE6 Converter, 6BJ6 IF Amplifier, 12AT6 Det. -AVC-AF Amp., 50C5 Output 35W4 Rectifier |
| POWER SUPPLY | 105-125 Volts AC-60 Cycles — RATING .27 Amp. @ 117 Volts AC |
| TUNING RANGE—BROADCAST | 540KC-1610KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to pin 7 (grid) of 12BE6 (V2). Low side to B-. | 455KC (400~ Mod.) | Tuning gang fully open | Across Voice Coil | A1, A2, A3, A4 | Adjust for maximum output. |
| 2. | " | " | 1610KC | " | " | A5 | " |
| 3. | | Loop | 1400KC | Tune to 1400KC signal | " | A6, A7 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |



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# PARTS LIST AND DESCRIPTIONS



## TUBES (GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amplifier | 6BJ6 | |
| V2 | Converter | 12BE6 | |
| V3 | IF Amplifier | 6BJ6 | |
| V4 | Det.-AVC-AF Amp. | 12AT6 | |
| V5 | Output | 50C5 | |
| V6 | Rectifier | 35W4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | SILVERTONE PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | 70 | 150 | 18-326 | PRS150V5030-20 | BBRD8415 | TCD498 | TDLD-10 | FMT-315 | TVA-2460 |
| B | 30 | 150 | | | | | | | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | SILVERTONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | .05 | 400 | 16-189 | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C3 | .05 | 200 | 16-197 | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C4 | 47 | | 15-359 | | | | | | | |
| C5A | 220 | | † 17-111 | † PA-113-2 | † PC-151 | † 116TM2 | †1408-02 | | † DT-2 | |
| B | 5000 | | | | | | | | | |
| C | 5000 | | | | | | | | | |
| D | 250 | | | | | | | | | |
| E | | | | | | | | | | |
| C6 | 5000 | | 15-320 | BPD-005 | DD-502 | K080 | 811-005 | DC525 | 5HK-D5 | |
| C7 | .047 | 400 | 16-447 | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C8 | .05 | 400 | 16-189 | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |

† Items C5A, C5B, C5C, C5D, C5E, R9A, R9B and R9C are combined in one unit. When replacing items separately, C5D and C5E should total 250MMF.

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | SILVERTONE PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 1Meg | ½ | A24-228 | AB-70 | A47-1Meg-Z | Q13-137 | U-53 | Volume |
| B | Shaft | | Not Req. | AK-4 | KSS-3 | Not Req. | Not Req. | Attach to R1A. |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | SILVERTONE PART No. | IRC PART No. | |
| R2 | 6800Ω | | 606820K | BTS-6800 | |
| R3 | 82Ω | | 608200K | BTS-82 | |
| R4 | 100KΩ | | 601040M | BTS-100K | |
| R5 | 22KΩ | | 602230M | BTS-22K | |
| R6 | 47Ω | | 604700K | BTS-47 | |
| R7 | 2.2Meg | | 602250M | BTS-2.2Meg | |
| R8 | 47KΩ | | 604730M | BTS-47K | |

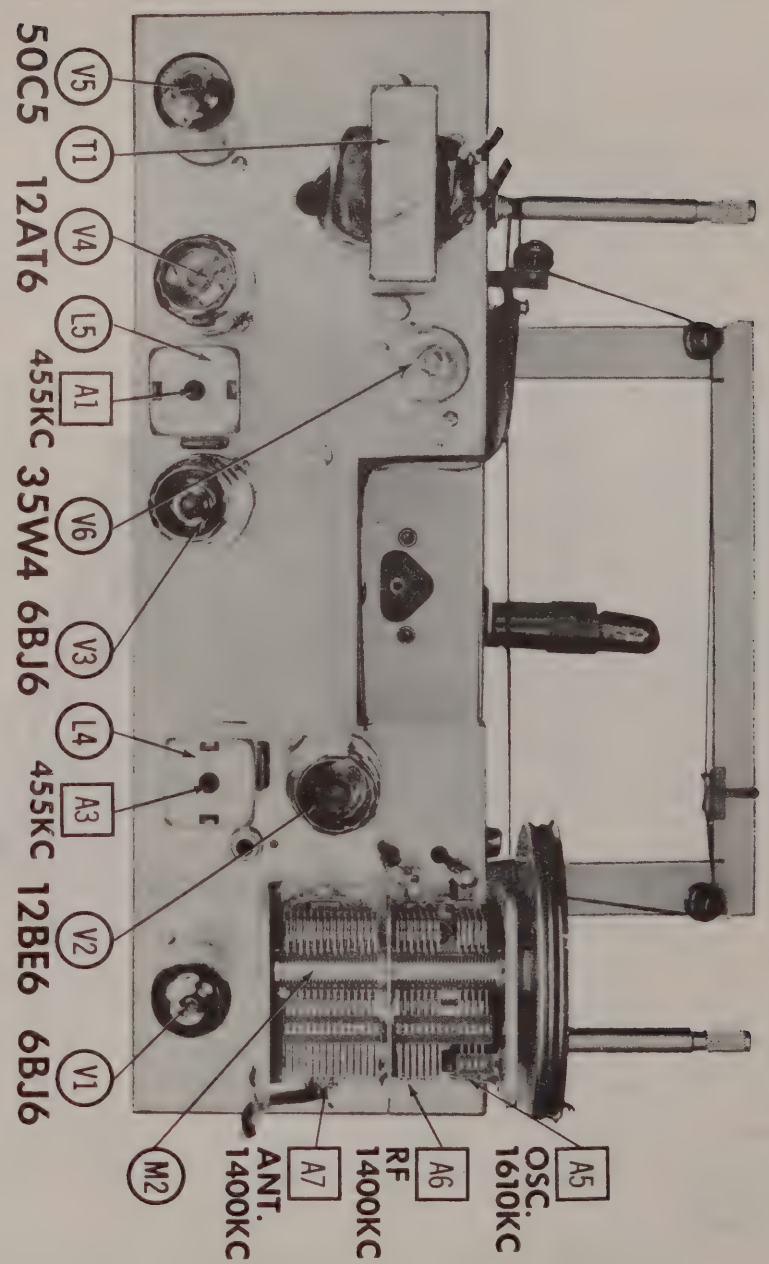
| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | SILVERTONE PART No. | IRC PART No. | |
| R9A | 6.8Meg | | † 17-111 | BTS-6.8Meg | |
| B | 470KΩ | | | BTS-470K | |
| C | 470KΩ | | | BTS-470K | |
| R10 | 120Ω | | 601210K | BTS-120 | |
| R11 | 10KΩ | 2 | 601032K | BTB-10K | |
| R12 | 1000Ω | 1 | 601021K | BTA-1000 | |
| R13 | 15Ω | | 601500K | BTS-15 | |
| R14 | 330Ω | | 603310K | BTS-330 | |

† Items R9A, R9B, R9C, C5A, C5B, C5C, C5D, C5E are combined in one unit.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | SILVERTONE PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 2.4KΩ | 3-4Ω | 80-312 | Z1001 | A-2829 | A-3876 | 24S50 | S-1X | |

# CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## SPEAKER

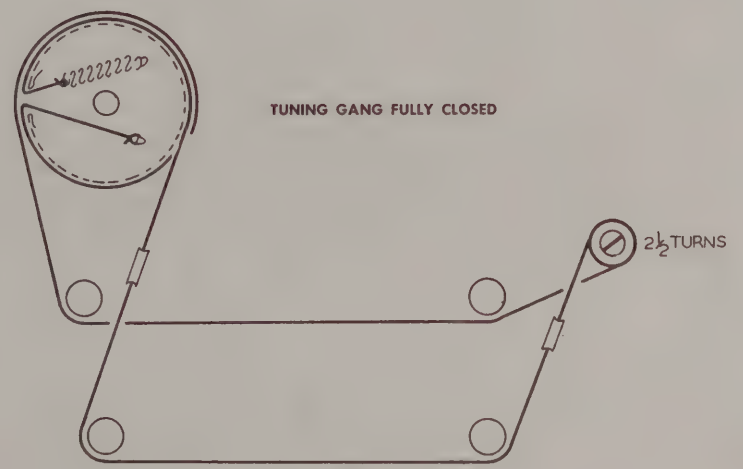
| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | SILVERTONE PART No. | QUAM PART No. | RCA TYPE No. | |
| SP1 | 5" | PM | 3-4Ω | 79-412 | 5A1 | 228S1 | |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | SILVERTONE PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Loop Ant. | 3Ω | | 82-100 | | | | |
| L2 | RF Coil | 8Ω | 13Ω * | 10-655 | | | | * Tapped @ 9Ω |
| L3 | Osc. Coil | .9Ω | 9.7Ω | 10-654 | | | | |
| L4 | Input IF | 16Ω | 16Ω | 10-521 | 16-6758 | BC-352 | 12-C1 | |
| L5 | Output IF | 9Ω | 9Ω | 10-529 | 16-6758 | BC-353 | 12-C2 | |

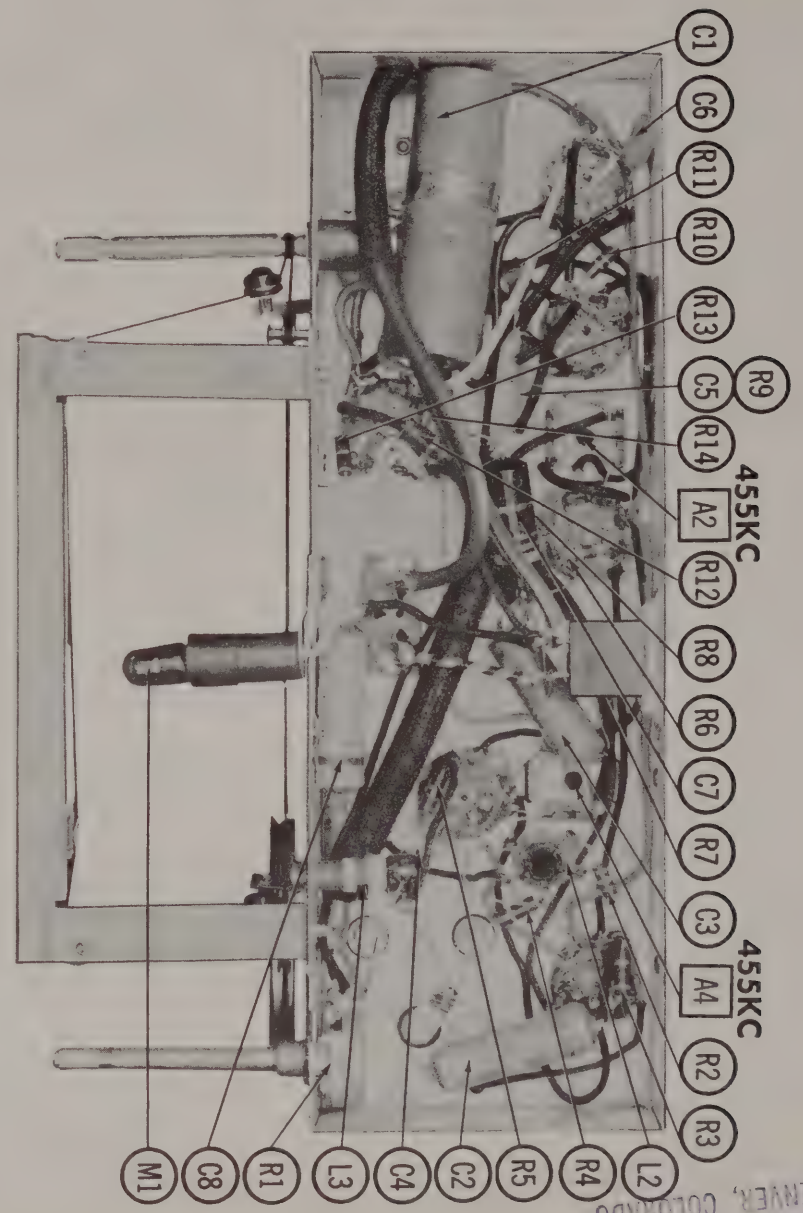
## MISCELLANEOUS

| ITEM No. | PART NAME | SILVERTONE PART No. | NOTES |
|---|---|---|---|
| M1 | Dial Light | 89-7 | #47 |
| M2 | Tuning Cap. | 19-248 | 3 Gang (25-490MMF, 10-90MMF, 12-215MMF) |
| M3 | Clock Assy. | 84-1876 | Includes Timer, Face, & Hands |
| | Cabinet | 42-770 | Model 6025 |
| | Cabinet | 42-771 | Model 6026 |
| | Knob | 52-456 | Clock (3 Used) |
| | Knob | 52-452 | Volume & Tuning |
| | Dial Pointer | 58-104 | |
| | Crystal | 48-81 | Clock & Dial |
| | Clock Face | 67-593 | |
| | Second Hand | 58-100 | Clock |
| | Minute Hand | 58-101 | Clock |
| | Hour Hand | 58-102 | Clock |
| | Alarm Hand | 58-103 | Clock |




DIAL CORD STRINGING

# CHASSIS—BOTTOM VIEW

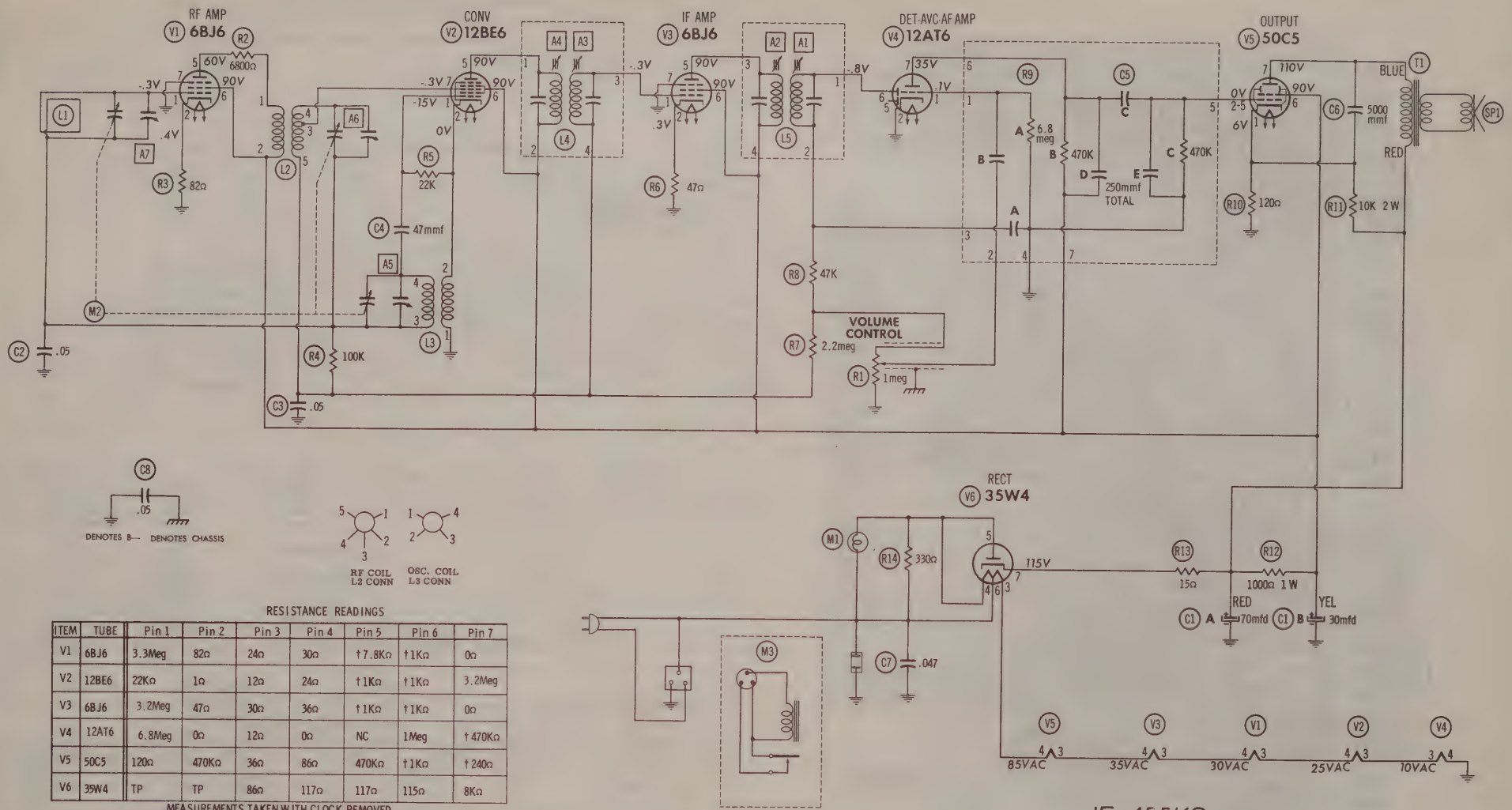



DENVER, COLORADO
3024 LARIMER ST.



SILVERTONE
MODEL 6025 (Ch. 528.40400)

SILVERTONE
MODEL 6025 (Ch. 528.40400)




DENOTES B— DENOTES CHASSIS

RF COIL L2 CONN

OSC. COIL L3 CONN

RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 6BJ6 | 3.3Meg | 82Ω | 24Ω | 30Ω | †7.8KΩ | †1KΩ | 0Ω |
| V2 | 12BE6 | 22KΩ | 1Ω | 12Ω | 24Ω | †1KΩ | †1KΩ | 3.2Meg |
| V3 | 6BJ6 | 3.2Meg | 47Ω | 30Ω | 36Ω | †1KΩ | †1KΩ | 0Ω |
| V4 | 12AT6 | 6.8Meg | 0Ω | 12Ω | 0Ω | NC | 1Meg | †470KΩ |
| V5 | 50C5 | 120Ω | 470KΩ | 36Ω | 86Ω | 470KΩ | †1KΩ | †240Ω |
| V6 | 35W4 | TP | TP | 86Ω | 117Ω | 117Ω | 115Ω | 8KΩ |

MEASUREMENTS TAKEN WITH CLOCK REMOVED.

† MEASURED FROM PIN 7 OF V6.

NC NO CONNECTION

TP TIE POINT

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP

IF=455KC

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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PHOTOFACT* Folder
*TRADE MARK

# SYLVANIA MODELS 21C401 Series, 21C403 Series, 21T101 Series, 21T102 Series, 21T104 Series, 24T101 Series (Ch. 1-532-1, -2)

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SYLVANIA MODEL 21T101MU (Ch. 1-532-2)

SYLVANIA MODELS 21C401 Series, 21C403 Series, 21T101 Series, 21T102 Series, 21T104 Series, 24T101 Series (Ch. 1-532-1, -2)

| | | | |
|---|---|---|---|
| TRADE NAME | Sylvania | MODELS | CHASSIS |
| | | 21C401 Series, 21C403 Series, 21T101 Series, 21T102 Series, 21T104 Series, 24T101 Series | 1-532-1, -2 |
| MANUFACTURER | Sylvania Electric Products Inc., Radio & Television Div., 254 Rano St., Buffalo 7, N.Y. | | |
| TYPE SET | Television Receiver | | |
| TUBES | Nineteen | | |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle | RATING 1.56 Amp. @ 117 Volts AC | |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) | | |

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SYLVANIA MODELS 21C401 Series, 21C403 Series, 21T101 Series, 21T102 Series, 21T104 Series, 24T101 Series (Ch. 1-532-1, -2)

## DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove only the channel selector, fine tuning and UHF tuning knobs (all other front control knobs are permanently mounted to cabinet and extension shaft assemblies disengage automatically when chassis is removed).

2. Remove 7 wood screws. Remove rear cover.

3. Remove 2 wood screws holding AC interlock and 2 wood screws holding 2 antenna terminal brackets.

4. Disconnect speaker leads, HaloLight plug (if cabinet is equipped), yoke plug, HV lead and picture tube socket. (Slip picture tube socket leads out of slots in fiber yoke shield).

5. Remove 3 chassis bolts. Remove chassis by sliding from cabinet.

6. Remove 2 speaker nuts. Remove speaker.

| MODEL | CHASSIS |
|---|---|
| 21T101MU | 1-532-2 |

## SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Turn horizontal hold until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L14) located on top of the chassis.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting a magnetic ring around the neck of picture tube located flush against the yoke. Turn the knurled knob and at the same time rotate the ring around the tube until picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

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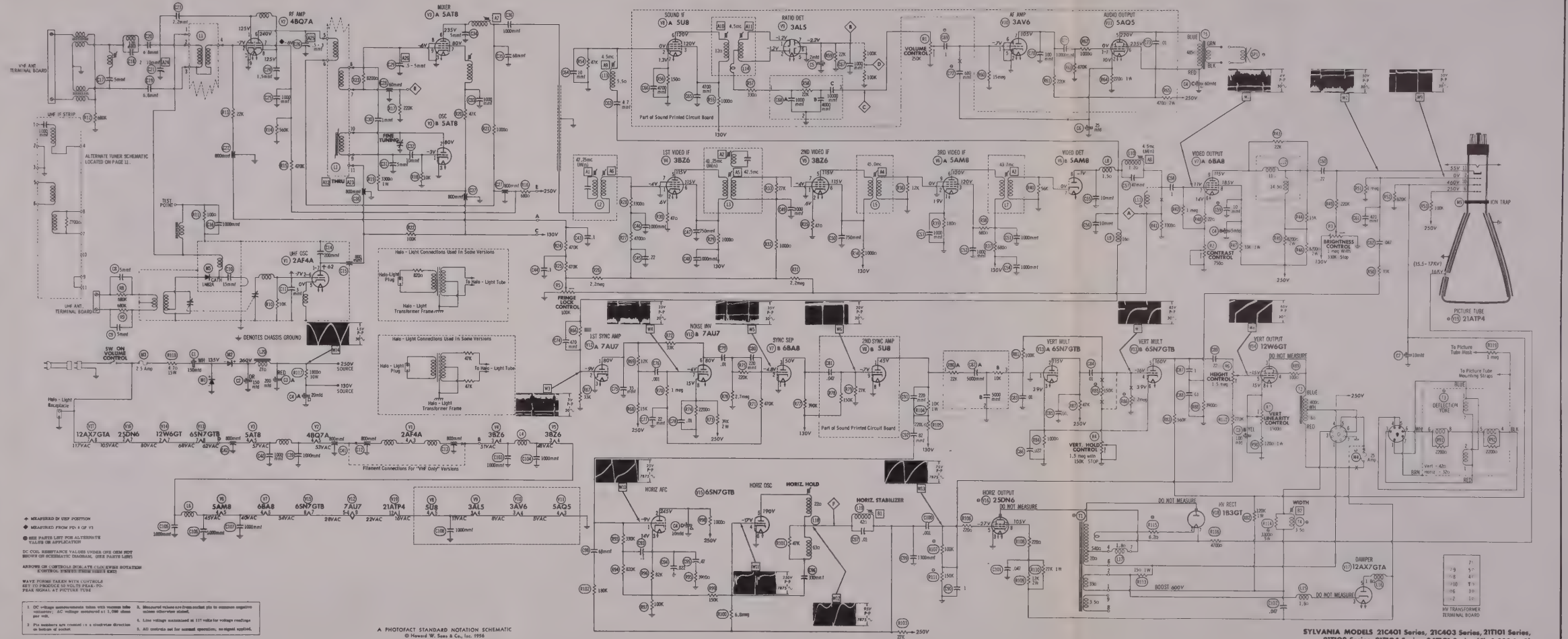
RF AMP V2 4BQ7A
MIXER V3 A 5AT8
OSC V3 B 5AT8
SOUND IF V8 A 5U8
RATIO DET V5 3AL5
AF AMP V10 3AV6
AUDIO OUTPUT V11 5AQ5
VOLUME CONTROL 250K
1ST VIDEO IF V4 3BZ6
2ND VIDEO IF V5 3BZ6
3RD VIDEO IF V6 A 5AM8
VIDEO DET V6 B 5AM8
VIDEO OUTPUT V7 A 6BA8
CONTRAST CONTROL 750Ω
BRIGHTNESS CONTROL 1 meg with 130K Stop
ION TRAP
PICTURE TUBE V11 21ATP4
UHF OSC V1 2AF4A
UHF ANT. TERMINAL BOARD
VHF ANT. TERMINAL BOARD
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 11.
UHF IF STRIP
TEST POINT
FINE TUNING
THRU
Part of Sound Printed Circuit Board
FRINGE LOCK CONTROL 100K
NOISE INV V13 A 7AU7
1ST SYNC AMP V12 A 7AU7
SYNC SEP V7 B 6BA8
2ND SYNC AMP V8 B 5U8
VERT MULT V13 A 6SN7GTB
VERT MULT V13 B 6SN7GTB
VERT OUTPUT V14 12W6GT
DO NOT MEASURE
HEIGHT CONTROL 1.5 meg
VERT LINEARITY CONTROL 1 meg
VERT. HOLD CONTROL 1.5 meg with 150K STOP
To Picture Tube Mask
To Picture Tube Mounting Straps
DEFLECTION YOKE
Vert - 42Ω
Horiz - 32Ω
HORIZ AFC V15 6SN7GTB
HORIZ OSC
HORIZ. HOLD
HORIZ. STABILIZER
HORIZ OUTPUT V16 25DN6
HV RECT V18 1B3GT
WIDTH
BOOST 600V
DAMPER V17 12AX7GTA
HV TRANSFORMER TERMINAL BOARD
SW. ON VOLUME CONTROL
Halo - Light Receptacle
Halo - Light Connections Used In Some Versions
Halo - Light Plug
Halo - Light Transformer Frame
To Halo - Light Tube
DENOTES CHASSIS GROUND
250V SOURCE
130V SOURCE
Filament Connections For "VHF Only" Versions
12AX7GTA 25DN6 12W6GT 6SN7GTB 5AT8 4BQ7A 2AF4A 3BZ6 3BZ6
5AM8 6BA8 6SN7GTB 7AU7 21ATP4 5U8 3AL5 3AV6 5AQ5

◆ MEASURED IN UHF POSITION

◆ MEASURED FROM PD-8 OF V3

● SEE PARTS LIST FOR ALTERNATE VALUES OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL SYMBOL THUS (SEE KNOB)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

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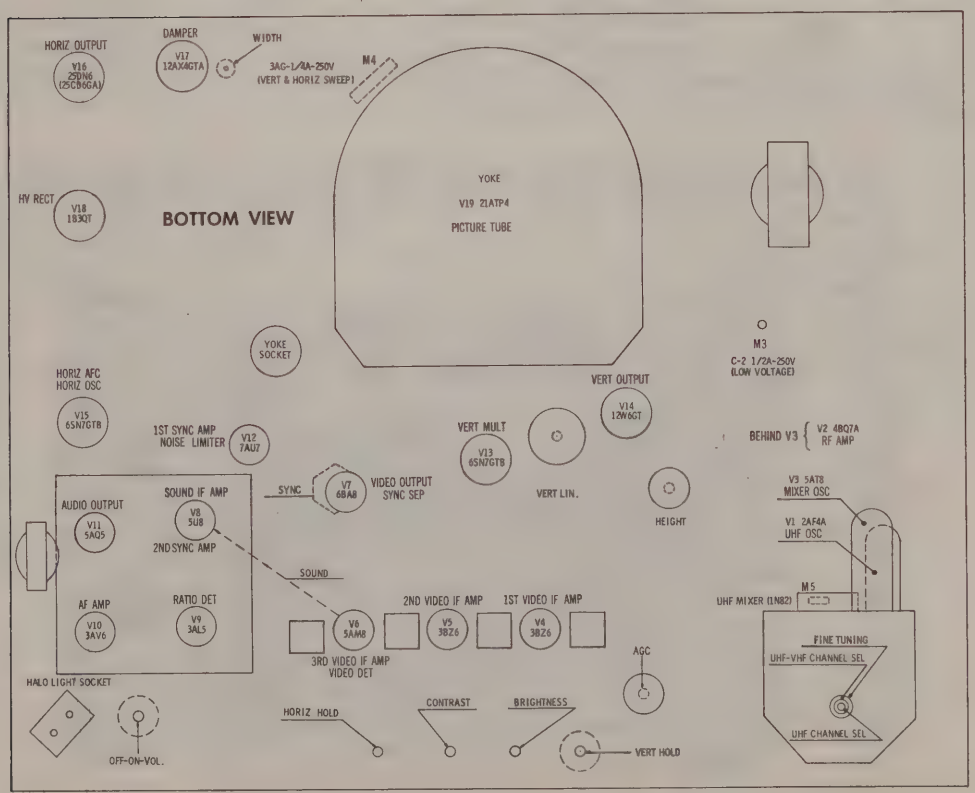
SYLVANIA MODELS 21C401 Series, 21C403 Series, 21T101 Series, 21T102 Series, 21T104 Series, 24T101 Series (Ch. 1-532-1, -2)

SYLVANIA MODELS 21C401 Series, 21C403 Series, 21T101 Series, 21T102 Series, 21T104 Series, 24T101 Series (Ch. 1-532-1, -2)

# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 2AF4A | *†5KΩ | 10K | 12Ω | 13Ω | 0Ω | 10KΩ | *†7KΩ | | |
| V2 | 4BQ7A | INF | 800K | 0Ω | 14Ω | 13Ω | †700Ω | 250K | INF | 0Ω |
| V3 | 5AT8 | 10K | †5K | 0Ω | 15Ω | 14Ω | †1.7K | †47K | 0Ω | 220K |
| V4 | 3BZ6 | 1Meg | 47Ω | 12Ω | 11Ω | †2.8K | †2.8K | 0Ω | | |
| V5 | 3BZ6 | 1Meg | 47Ω | 11Ω | 10Ω | †2.8K | †2.8K | 0Ω | | |
| V6 | 5AM8 | 180Ω | .1Ω | †3K | 10Ω | 9Ω | †2.5K | .1Ω | 3.3K | 0Ω |
| V7 | 6BA8 | 0Ω | 3Meg | †390K | 9Ω | 8Ω | ●600Ω | 1Meg | †33K | †4K |
| V8 | 5U8 | †14K | 47K | †2.8K | 4Ω | 3Ω | †2.8K | 150Ω | 0Ω | 20K |
| V9 | 3AL5 | INF | INF | 3Ω | 2Ω | 0Ω | 0Ω | 22K | | |
| V10 | 3AV6 | 15Meg | 0Ω | 2Ω | 1Ω | 0Ω | 0Ω | †220K | | |
| V11 | 5AQ5 | 470K | 270Ω | 0Ω | 1Ω | †1K | †500Ω | 470K | | |
| V12 | 7AU7 | †27K | 9K | 0Ω | 6Ω | 6Ω | †60K | 4Meg | 2.2K | 5Ω |
| V13 | 6SN7GTB | 0Ω | †47K | 1K | ●400K | ▲650K | 1K | 16Ω | 15Ω | |
| V14 | 12W6GT | NC | 19Ω | †400Ω | †500Ω | ●1.2Meg | NC | 16Ω | ●400Ω | |
| V15 | 6SN7GTB | 1.2Meg | †1K | 180K | 250K | †27K | 0Ω | 6Ω | 8Ω | |
| V16 | 25DN6 | NC | 25Ω | 0Ω | TP | 250K | TP | 19Ω | †8.5K | TOP CAP ▲35Ω |
| V17 | 12AX4GT | NC | TP | 400K | NC | †29Ω | TP | 28Ω | 25Ω | |
| V18 | 1B3GT | | PINS | 1 - 8 | HAVE | INF | RESISTANCE | | | TOP CAP ▲575Ω |
| V19 | 21ATP4 | 4Ω | 1Meg | PIN 6 100K | PIN 10 ▲120K | PIN 11 ●400K | PIN 12 5Ω | | | |

* MEASURED IN UHF POSITION.
† MEASURED FROM POSITIVE SIDE OF C2.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▲ MEASURED FROM PIN 3 OF V17.
TP TIE POINT
NC NO CONNECTION.




# TUBE PLACEMENT CHART

# ALIGNMENT INSTRUCTIONS

### ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped away from the chassis.
Allow a 15 minute warm-up period for receiver and test equipment.

### VIDEO IF ALIGNMENT

Connect the negative lead of a 3.5 volt bias supply to the ungrounded side of C45. Connect the positive lead to chassis. Use non-metallic alignment tools
If the marker generator is a separate unit from the sweep generator, loosely couple marker generator to sweep generator output. Use low marker output.
Keep all leads from generators and scope shielded and as short as possible.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis. | Not used | 47.25MC | Any non-interfering high channel | Use VTVM. DC probe to point (X). Common to chassis. | A1 | Adjust for MINIMUM deflection. Use high signal generator output. |
| 2. | " | " | " | 41.25MC | " | " | A2 | " |
| 3. | " | " | " | 43.7MC | " | " | A3 | Attenuate generator output to maintain 1 to 2 volts on VTVM. Adjust for maximum deflection. |
| 4. | " | " | " | 45.0MC | " | " | A4 | " |
| 5. | " | " | " | 42.5MC | " | " | A5 | " |
| 6. | .001MFD | High side to pin 1 (grid) of 3BZ6 (V4). Low side to chassis. | 43.5MC (10MC Swp.) | 42.4MC 45.75MC | " | Vert. amp. thru 33K to point (X). Low side to chassis. | | Check for response similar to Fig. 1. If necessary, retouch A3 thru A5 to obtain desired response. A4 affects high frequency side of curve. A5 affects low frequency side. Adjust A3 for maximum amplitude and MINIMUM tilt. Repeat steps 1 and 2. |
| 7. | Direct | High side to ungrounded tube shield floating over converter tube (V3). Low side to chassis. | " | 41.25MC 42.80MC 45.75MC | " | " | A6, A7 | Adjust A6 and A7 for response similar to Fig. 2. If necessary, retouch A3, A4 and A5 for correct tilt and position of 45.75MC and 42.4MC markers. Increase sweep generator and scope output to observe trap markers. If necessary, retouch A1 and A2 to place markers in trap notches as in Fig. 3. Remove bias and test equipment. |

### 4.5MC TRAP ALIGNMENT

Ground pin 1 of 3BZ6 (V5) with a short clip lead to chassis.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 8. | .001MFD | High side to pin 7 (grid) of 6BA8 (V7). Low side to chassis. | 4.5MC (Unmod.) | Any | DC probe thru detector (Fig. 7) to pin 11 (cathode) of picture tube. Common to chassis. | A8 | Adjust A8 for MINIMUM deflection. Remove short from V5. |

### ALTERNATE 4.5MC TRAP ALIGNMENT USING ON THE AIR SIGNAL

Turn set on and tune in a TV station. Misadjust fine tuning until sound bars can be seen in the picture. A fine grain-like background will be noted in the picture.
Adjust A8 until the grain-like background is eliminated or at a minimum.
Readjust the fine tuning for a normal picture.

### SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±5%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (X) as shown on the schematic.
Short pin 1 of 3BZ6 (V5) to chassis with a short jumper wire or clip lead.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 9. | 47K Resistor | High side to ungrounded side of C56. Low side to chassis. | 4.5MC (Unmod.) | Any non-interfering channel | DC probe to point (X). Common to chassis. | A9, A10 | Adjust for maximum deflection. |
| 10. | " | " | " | " | DC probe to point (X). Common to point (Y). | All | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

### SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 80% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 9. | 47K Resistor | High side to ungrounded side of C56. Low side to chassis. | 4.5 MC (450KC Swp.) | 4.5MC | Any non-interfering channel | Vert. amp. to point (B). Low side to chassis. | A9, A10 | Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3. |
| 10. | " | " | " | " | " | Vert. amp. to point (X). Low side to chassis. | All | Reconnect C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines. |

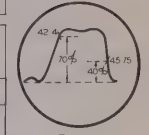


FIG. 1

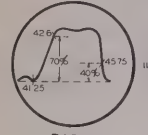


FIG. 2

FIG. 3

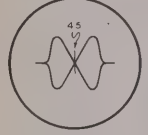


FIG. 4

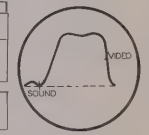


FIG. 5

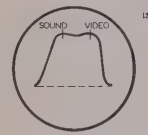


FIG. 6

### VHF OSCILLATOR ALIGNMENT

Connect the bias as under "Video IF Alignment".
Disconnect ground connection from pin 3 (Grid) of 2SD86 (V16) to eliminate possible erroneous indications.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.
Use only enough sweep generator output to provide usable pattern on scope.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 11. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead | 213MC (10MC Swp.) | 211.25MC 215.75MC | 13 | Vert. amp. thru 47KΩ to point (X). Low side to chassis. | A12 | Adjust to place sound marker in trap notch as in Fig. 5. Video marker should fall at 50%. |
| | | | 207MC (10MC Swp.) | 205.25MC 209.75MC | 12 | | A13 | |
| | | | 201MC (10MC Swp.) | 199.25MC 203.75MC | 11 | | A14 | |
| | | | 195MC (10MC Swp.) | 193.25MC 197.75MC | 10 | | A15 | |
| | | | 189MC (10MC Swp.) | 187.25MC 191.75MC | 9 | | A16 | |
| | | | 183MC (10MC Swp.) | 181.25MC 185.75MC | 8 | | A17 | |
| | | | 177MC (10MC Swp.) | 175.25MC 179.75MC | 7 | | A18 | |
| | | | 83MC (10MC Swp.) | 83.25MC 87.75MC | 6 | | A19 | |
| | | | 79MC (10MC Swp.) | 77.25MC 81.75MC | 5 | | A20 | |
| | | | 69MC (10MC Swp.) | 67.25MC 71.75MC | 4 | | A21 | |
| | | | 63MC (10MC Swp.) | 61.25MC 65.75MC | 3 | | A22 | |
| | | | 57MC (10MC Swp.) | 55.25MC 59.75MC | 2 | | A23 | |

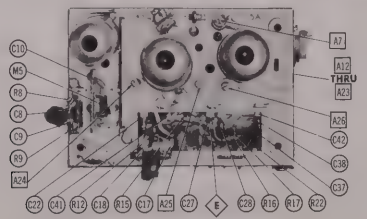
### VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2.5 volt bias supply to the tuner AGC terminal. Connect the positive lead to chassis.
Disconnect the ground connection from pin 3 (grid) of the 2SD86 (V16) to eliminate possible erroneous indications. All connecting leads should be as short as possible and shielded.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

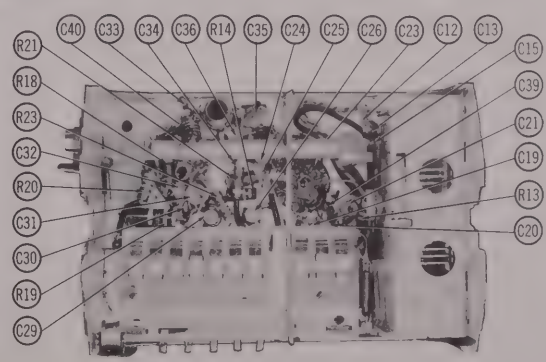
| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 12. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 207MC (10MC Swp.) | 205.25MC 209.75MC | 12 | Vert. amp. thru 10KΩ to point (X). Low side to chassis. | A24, A25, A26 | Adjust for response curve similar to Fig. 6 with markers above 90%. |
| 13. | " | " | 213MC (10MC Swp.) | 211.25MC 215.75MC | 13 | " | | Check for response similar to Fig. 6. If markers fall below 70% on any channel, make compromise adjustments of A24, A25, and A26 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected. |
| | | | 201MC (10MC Swp.) | 199.25MC 203.75MC | 11 | | | |
| | | | 195MC (10MC Swp.) | 193.25MC 197.75MC | 10 | | | |
| | | | 189MC (10MC Swp.) | 187.25MC 191.75MC | 9 | | | |
| | | | 183MC (10MC Swp.) | 181.25MC 185.75MC | 8 | | | |
| | | | 177MC (10MC Swp.) | 175.25MC 179.75MC | 7 | | | |
| | | | 85MC (10MC Swp.) | 83.25MC 87.75MC | 6 | | | |
| | | | 79MC (10MC Swp.) | 77.25MC 81.75MC | 5 | | | |
| | | | 69MC (10MC Swp.) | 67.25MC 71.75MC | 4 | | | |
| | | | 63MC (10MC Swp.) | 61.25MC 65.75MC | 3 | | | |
| | | | 57MC (10MC Swp.) | 55.25MC 59.75MC | 2 | | | |

### UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



RF TUNER TOP VIEW

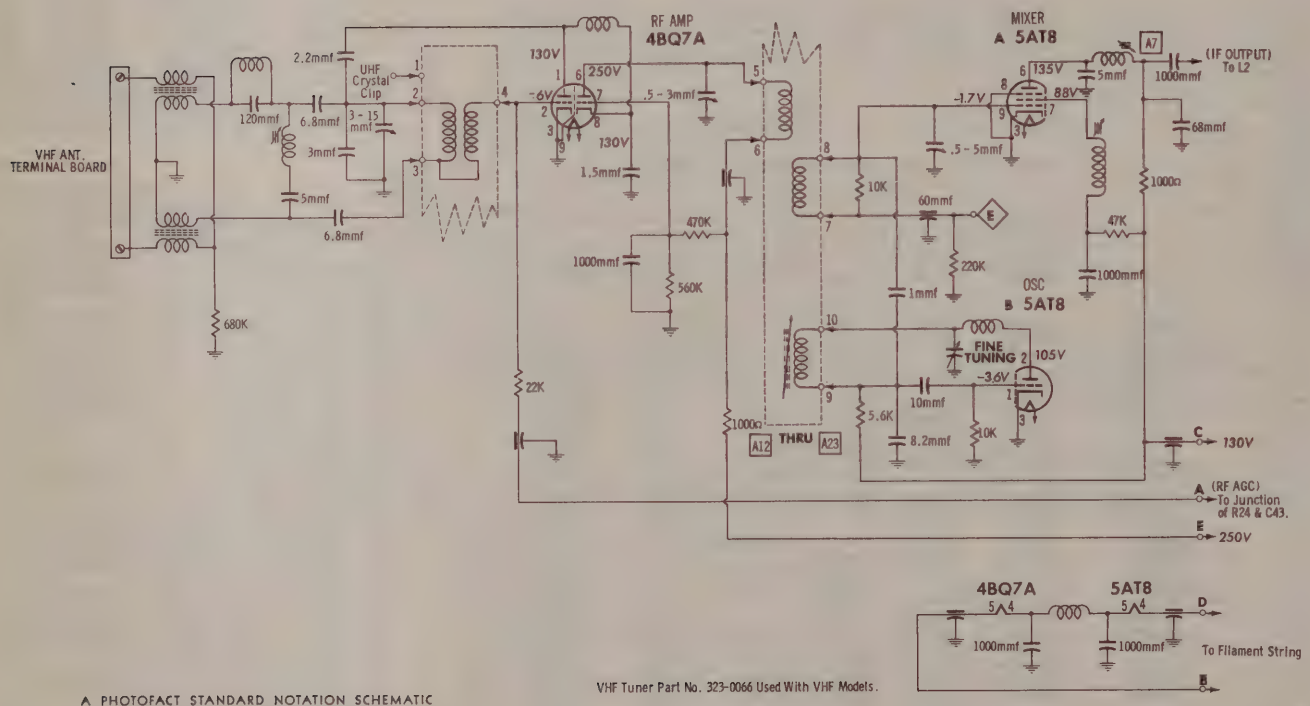


RF TUNER BOTTOM VIEW

SYLVANIA MODELS 21C401 Series, 21C403 Series, 21T101 Series, 21T102 Series, 21T104 Series, 24T101 Series (Ch. 1-532-1, -2)

## PRODUCTION CHANGES

| | |
|---|---|
| | The following production changes were made in late production.<br>The initail production run was coded "C-00" with the following runs coded "C-01", "C-02", etc. |
| C-01 | TO REDUCE PICTURE SMEAR<br>L11 is omitted. |
| C-02 | TO ELIMINATE VIDEO AMPLIFIER INSTABILITY<br>C59 is increased from 10MMF to 1000MMF. |
| C-03 | TO REDUCE AUDIO HUM<br>C69 is increased from .01MFD to .1MFD. \| C72 is added. |
| C-04 | TO IMPROVE PICTURE TUBE AQUADAG GROUNDING<br>The picture tube aquadag grounding spring is mounted on the deflection yoke shield ring and is grounded thru a fifth yoke wire connecting to terminal 7 of the yoke socket. |
| C-05 | TO IMPROVE CONTRAST<br>C59 is decreased from 1000MMF to 10MMF. |
| C-06 | TO IMPROVE VERTICAL HOLD CONTROL RANGE<br>A 390KΩ resistor (R85) is added from pin 4 of V13 to high side of vertical hold control (R4).<br>An 820KΩ resistor (R86) is added from pin 4 of V13 to ground. |
| C-07 | TO IMPROVE VERTICAL HOLD CONTROL RANGE<br>R85 is decreased from 390KΩ to 150KΩ. \| R86 is increased from 820KΩ to 2.2Meg. |
| C-08 | FUSE ADDED<br>A .25 Amp. fuse is added to the 250V line feeding the damper plate and horizontal output screen. |
| C-09 | TO REDUCE HORIZONTAL OSCILLATOR DRIFT<br>C97 is changed to a .01MFD, 600V, oil filled. |
| C-10 | TO IMPROVE HORIZONTAL LINEARITY<br>V16 is changed from 25CD6GA to a 25DN6. \| R107 is decreased from 180KΩ to 100KΩ.<br>T1 is changed to part #241-0038. \| R111 is decreased from 220KΩ to 150KΩ.<br>T4 is changed to part #132-0011. \| R114 is increased from 680Ω to 3.3KΩ. |




VHF Tuner Part No. 323-0066 Used With VHF Models.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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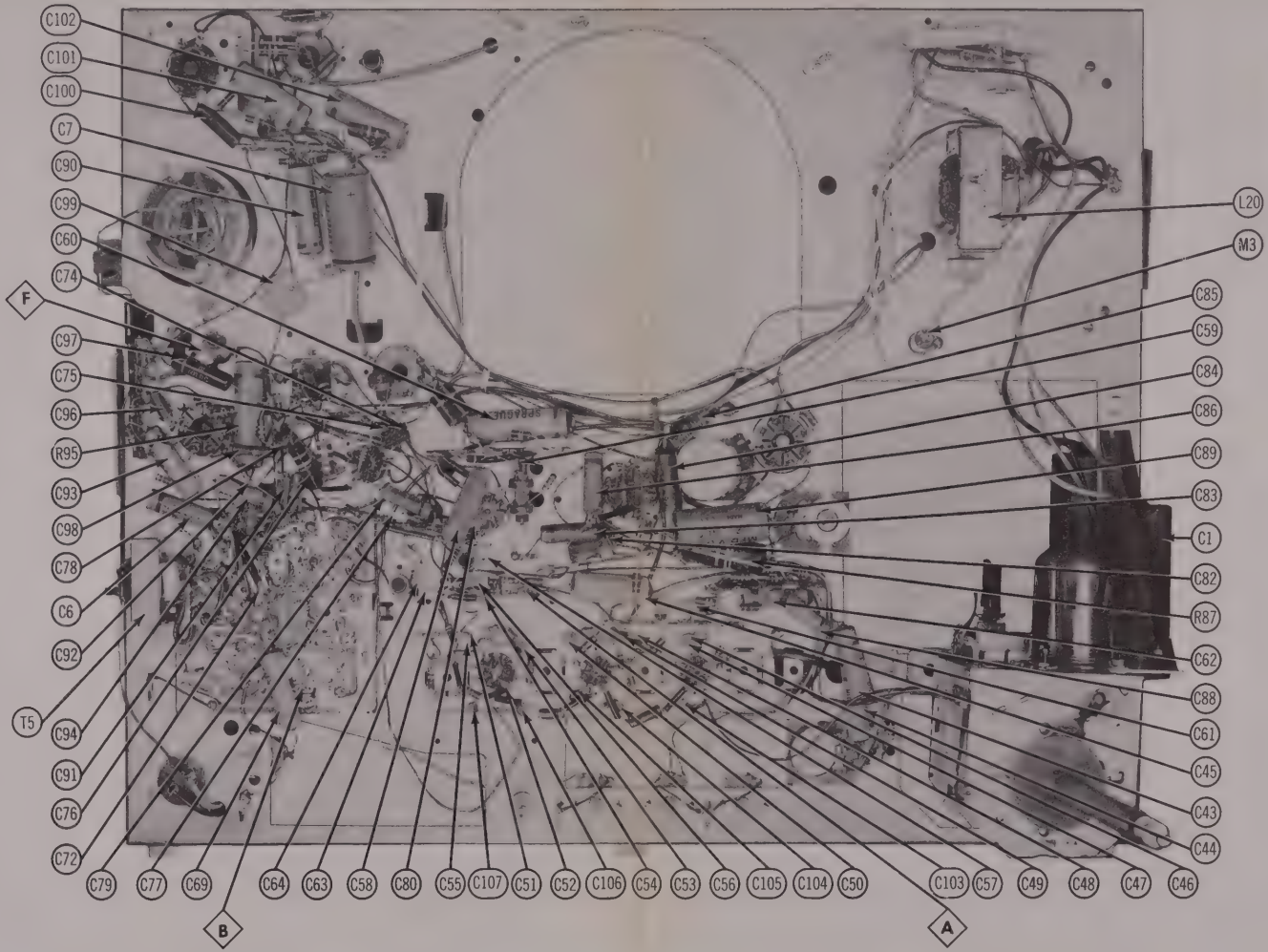
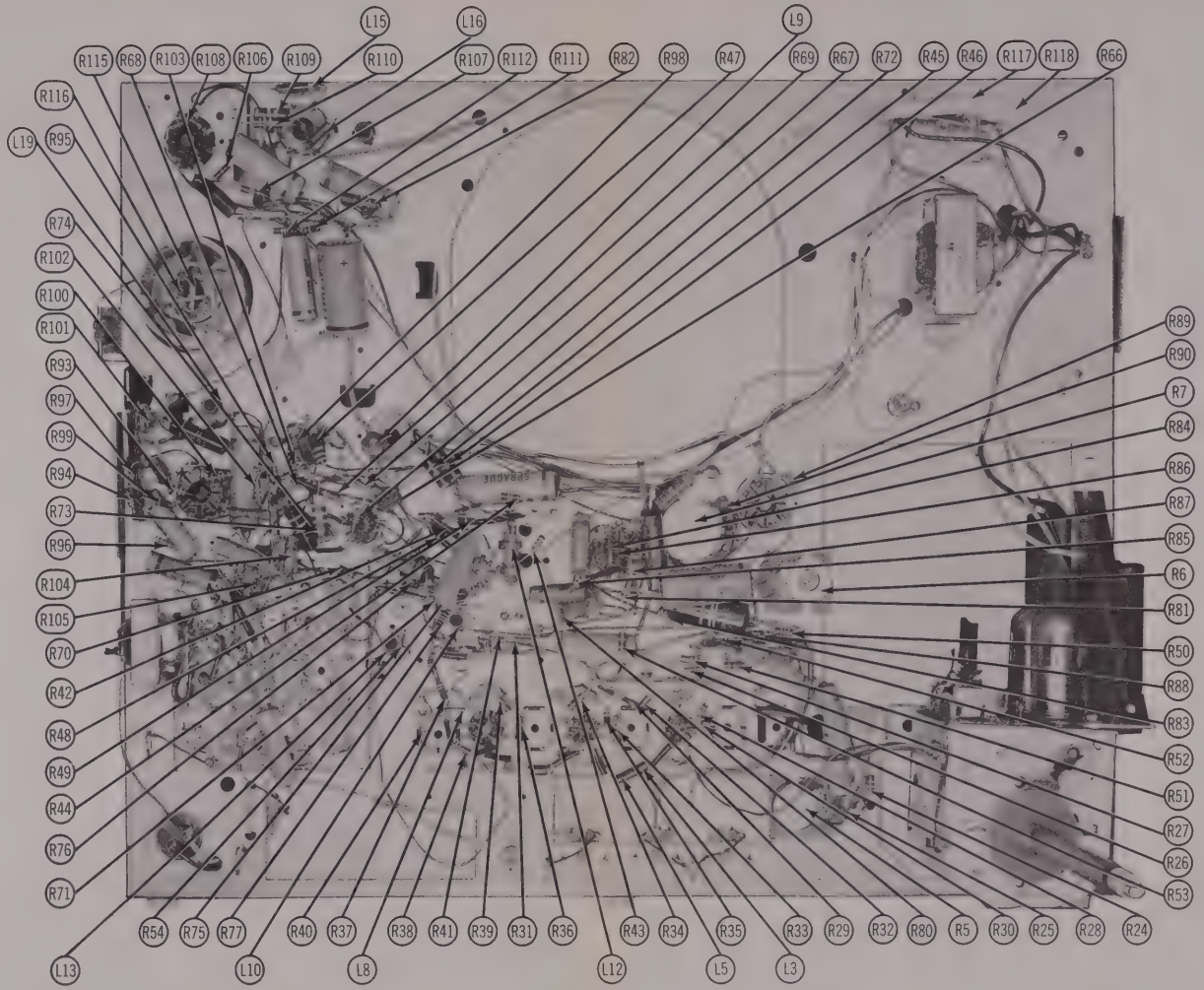
# ALTERNATE VHF TUNER SCHEMATIC

SET 328 FOLDER 11

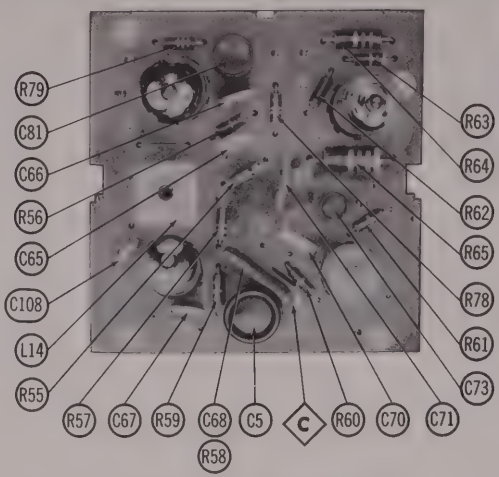



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

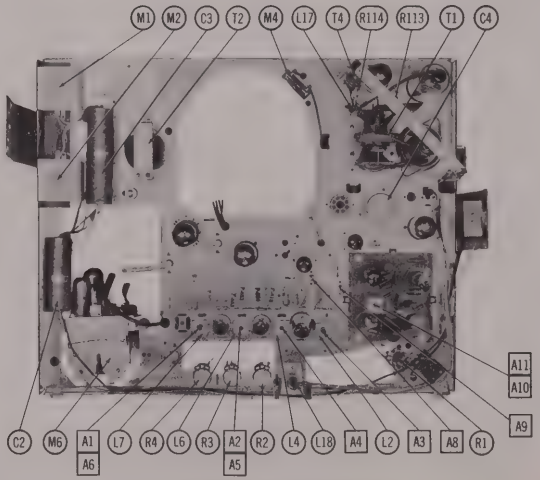
SYLVANIA MODELS 21C601 Series, 21C603 Series, 21T101 Series, 21T102 Series, 21T104 Series, 24T101 Series (Ch. 1-532-1, -2)



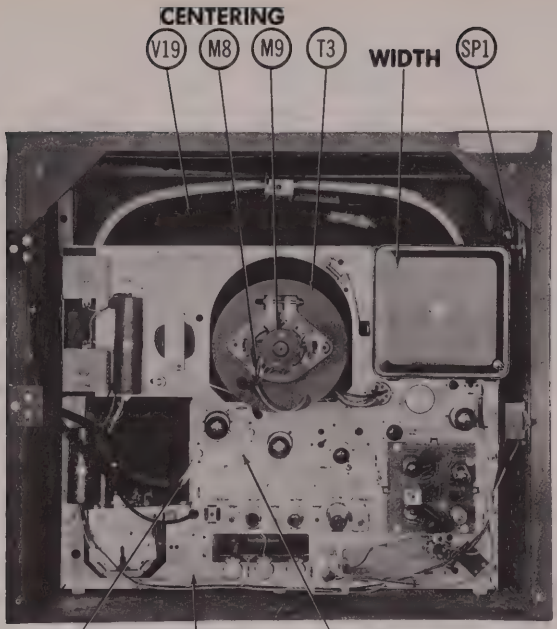

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION




**SOUND IF - SUB CHASSIS**




**CHASSIS - TOP VIEW**




CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the contrast control for a normal picture.

2. Turn the horizontal hold to the center of its lock-in range. If the picture does not lock in, connect a short clip lead across the horizontal stabilizing coil (L19) and adjust the horizontal hold to the center of the range in which the picture locks.

3. Remove the clip lead from L19. If the picture is now out of sync, adjust the horizontal stabilizing coil (B1) until the picture locks in.

4. Adjust the width slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally with the picture in sync.

5. Connect the vertical amplifier of the oscilloscope thru a low capacitor probe to point ⑦ and adjust B1 for waveform similar to Fig. 7 with peaks equal in amplitude. Keep picture in sync during this adjustment with the horizontal hold.

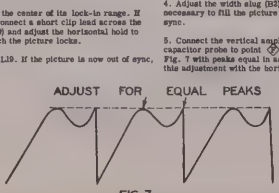



FIG. 7

# TRUETONE MODELS 2D1530A, B, 2D1532A, B, 2D1633A, 2D2530A, B

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TRUETONE MODEL 2D2530A

| | | |
|---|---|---|
| TRADE NAME | TRUETONE | MODELS<br>2D1530A, 2D1530B, 2D1532A, 2D1532B,<br>2D1633A, 2D2530A, 2D2530B |
| SUPPLIER | Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo. | |
| TYPE SET | Television Receiver | |
| TUBES | Sixteen | |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle | RATING 1.38 Amp. @ 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) | |

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TRUETONE MODELS 2D1530A, B, 2D1532A, B, 2D1633A, 2D2530A, B

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# DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.

2. Remove 2 metal screws holding upper left trim plate.

3. Remove 3 small knobs.

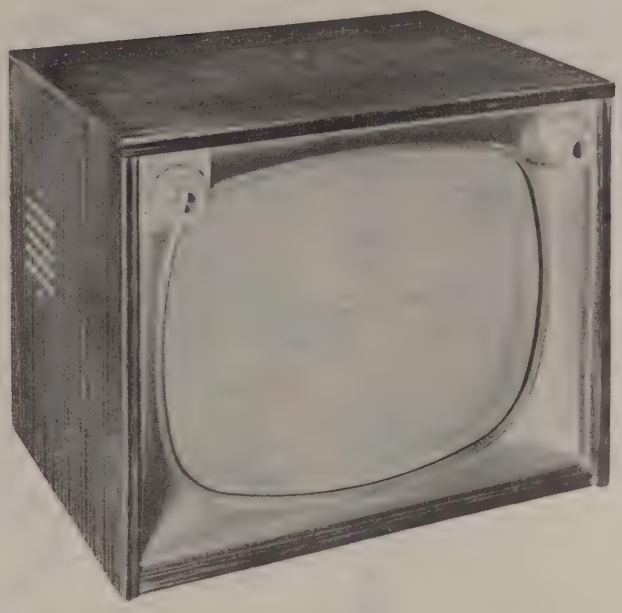
4. Remove 5 wood screws and 1 metal screw. Remove rear cover.

5. Disconnect speaker leads.

6. Remove 2 wood screws holding rear cabinet braces at the top.

7. Remove 6 cabinet bolts. Lift cabinet up and off.

8. Remove 2 speaker nuts. Remove speaker.



MODELS

2D1530A, 2D1530B, 2D1532A, 2D1532B, 2D1633A, 2D2530A, 2D2530B

TRUETONE MODELS 2D1530A, B,
2D1532A, B, 2D1633A, 2D2530A, B

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs and 2 metal screws holding trim plate, adjustments are accessible, one at a time, thru the small hole in the cabinet to the right and below the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 7 push-on type control knobs from front panel of cabinet. Remove 4 metal screws holding 2 trim plates. Remove trim plates. Tilt safety glass forward and lift out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on the tube side of the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L23) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the chassis. Adjust the buzz control (R7) for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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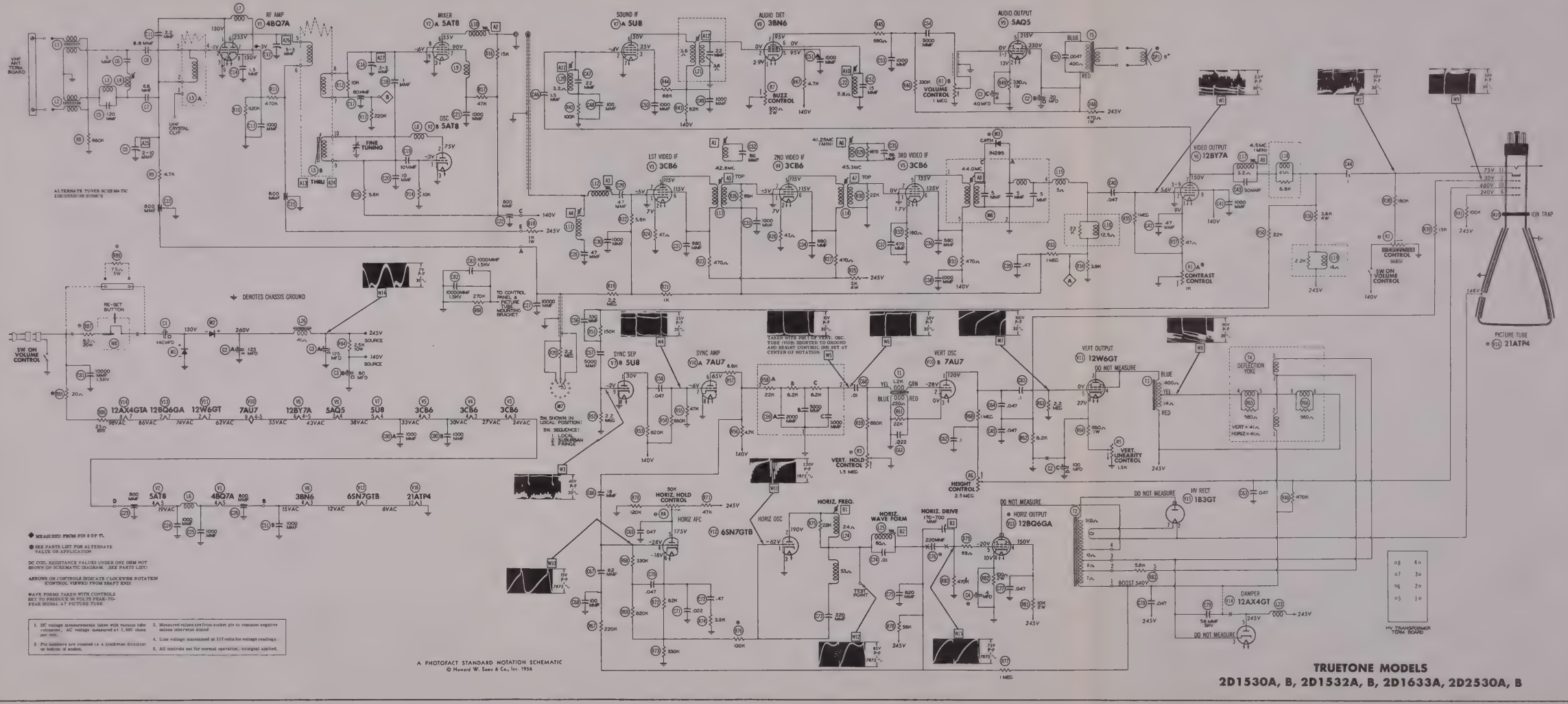


◆ MEASURED FROM PIN 8 OF V1.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation, no signal applied.

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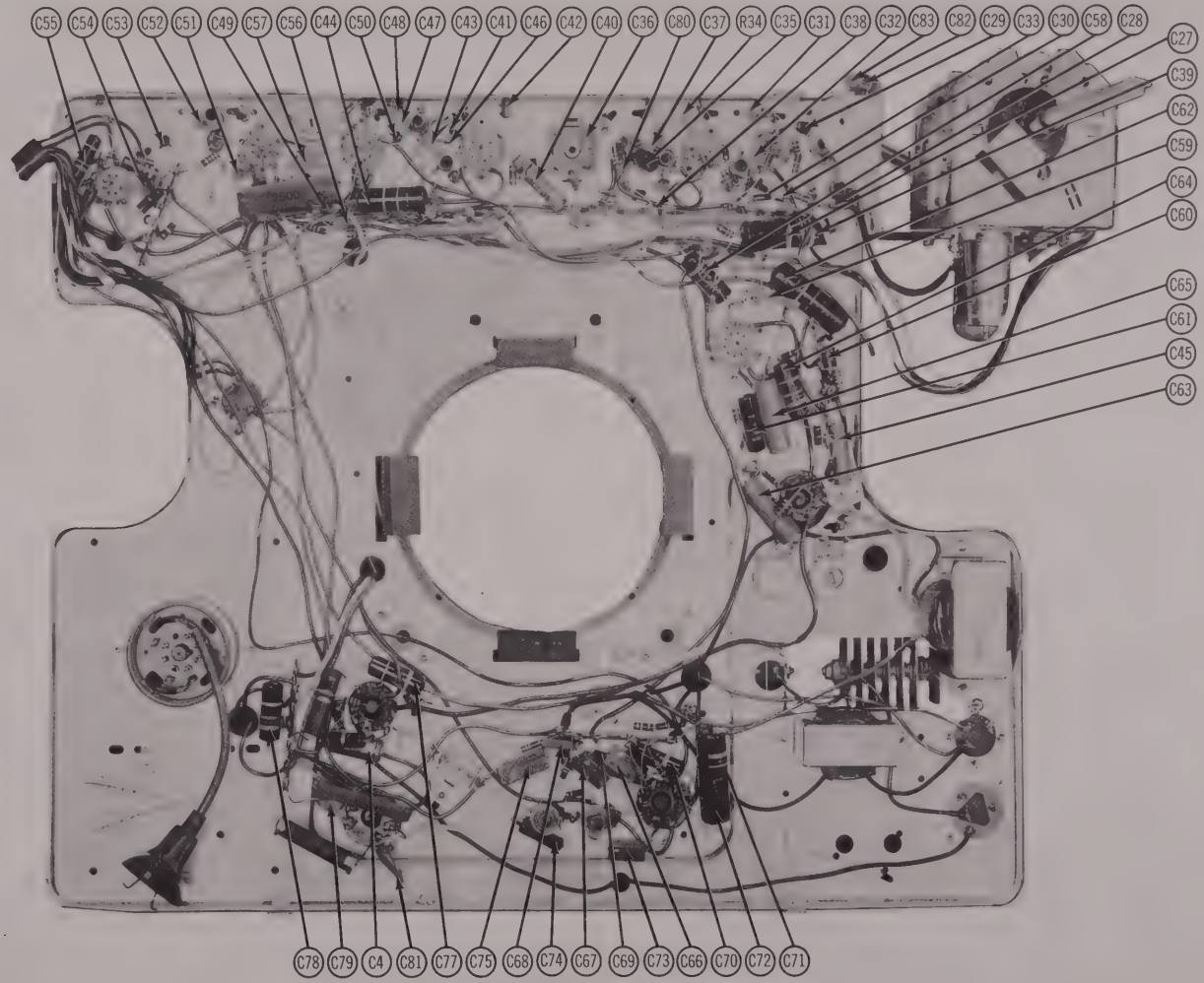
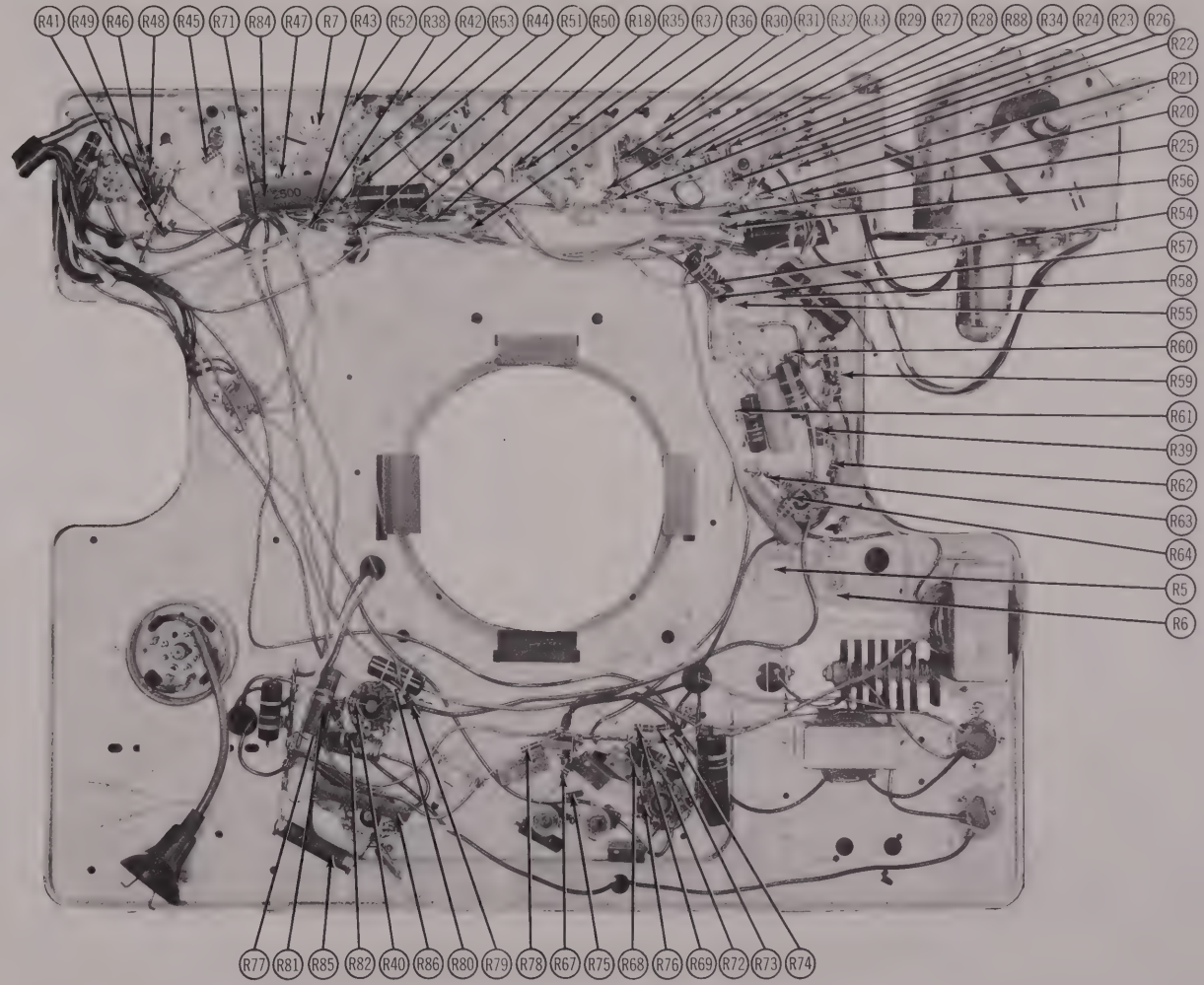
# TRUETONE MODELS
## 2D1530A, B, 2D1532A, B, 2D1633A, 2D2530A, B

TRUETONE MODELS
2D1530A, B, 2D1532A, B, 2D1633A, 2D2530A, B

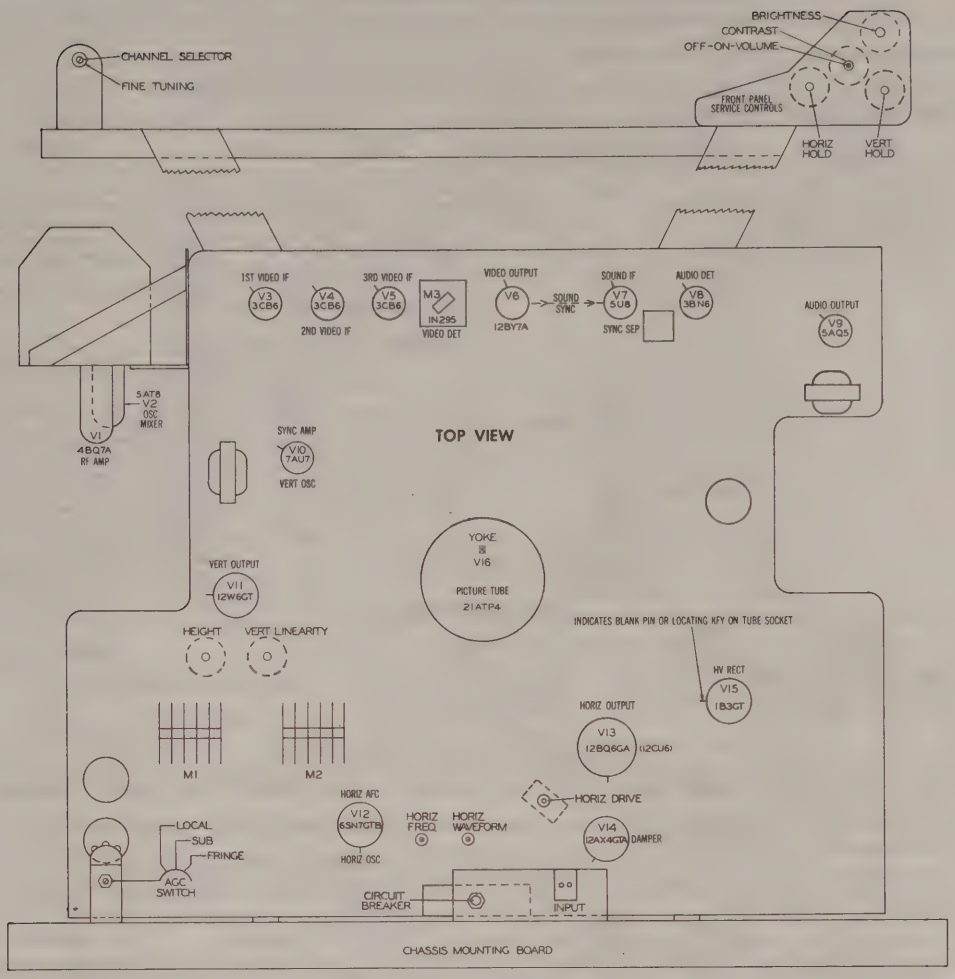



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

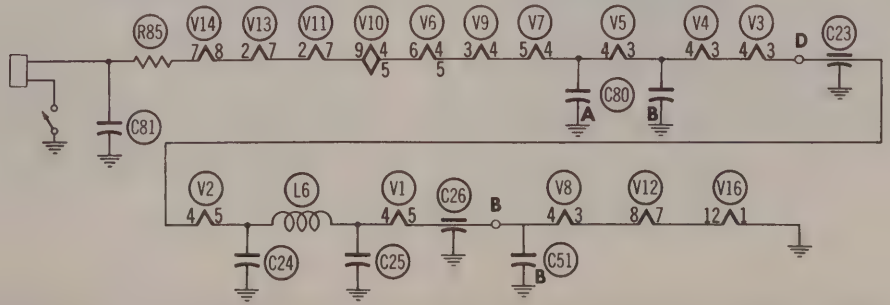
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V10**
No horiz. sync - **V10, V12**
No vert. or horiz. sync - **V7, V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V10, V11**
Poor vert. linearity or foldover - **V10, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, M1 & M2**
Vert. off freq. - **V10**
Horiz. off freq. - **V10, V12**

**NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).**




DENVER, COLORADO

TRUETONE MODELS
2D1530A, B, 2D1532A, B, 2D1633A, 2D2530A, B

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal oscillator (V12) to disable the high voltage.
Use an isolation transformer to protect the test equipment.

## VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to the ungrounded side of C33. Connect positive side to chassis.
Adjust sweep output to give adequate deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis. | 44MC (10MC Swp) | 47.25MC | Any non-interfering channel | Vert. Amp. thru detector probe (Fig. 1)., to pin 5 (plate) of 3CB6 (V3). Low side to chassis. | A1, A2, A3, A4 | Adjust for response curve similar to Fig. 2. A1 positions the 47.25MC marker in trap notch. A2, A3 and A4 is adjusted for maximum amplitude with proper tilt and markers properly positioned as in Fig. 2. |
| 2. | " | " | Not used | 42.8MC | " | USE VTVM DC probe to point (A). Common to chassis. | A5 | Adjust for maximum deflection. |
| 3. | " | " | " | 41.25MC | " | " | A6 | Adjust for MINIMUM deflection. |
| 4. | " | " | " | 45.3MC | " | " | A7 | Adjust for maximum deflection. |
| 5. | " | " | " | 44.0MC | " | " | A8 | Adjust for maximum deflection. |
| 6. | " | " | 44MC (10MC Swp) | 41.25MC<br>42.4MC<br>42.8MC<br>44.0MC<br>44.5MC<br>45.3MC<br>45.75MC<br>47.25MC | " | Vert. Amp. thru 10KΩ to point (A). Low side to chassis. | | If response is not similar to Fig.3, make SLIGHT corrective adjustments. The position of the 44.5MC marker is critical. A8 controls the symmetry of the top. A7 controls the height of the 45.75MC marker. DO NOT readjust A2 or A3. These adjustments should only be made as outlined in Step 1. |

## 4.5MC TRAP ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 7. | .005MFD | High side to pin 2 (grid) of 12BY7 (Video Output). Low side to chassis. | 4.5MC (Unmod) | Any | DC probe to pin 11, (cathode) of picture tube. Common to chassis. | A9 | Adjust for MINIMUM deflection. |

## SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Turn the set on and tune in a strong TV signal. Turn the buzz control (R7) 90 degrees from maximum clockwise rotation. Adjust A10 for maximum volume. Reduce the signal strength. (Remove the antenna from the antenna terminals and stray feed the signal by placing the antenna near the antenna terminals).
Adjust A11 and A12 for maximum volume. Adjust R7 for minimum noise. Reconnect antenna and readjust A10 for maximum volume. If necessary, reduce volume so this peak can be heard.

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set volume control at a low volume level.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8. | .01MFD | High side to pin 2 (grid) of 12BY7 (V6). Low side to chassis. | 4.5MC (400% Mod) (50KC Swp) | 4.5MC | Any non-interfering channel | Across secondary of T5. | A10 | Set buzz control (R7) 90 degrees from maximum clockwise rotation. Adjust A10 for maximum 400% indication on scope. |
| 9. | " | " | " | " | " | " | A12, A11 | Attenuate generator output so that signal is below limiting level of 3BN6 as evidenced by background hiss and noise. Adjust A12 and A11 for maximum 400% indication on scope. |
| 10. | " | " | " | 4.5MC (400% Mod) | " | " | R7 | Use a high generator output and adjust R7 for MINIMUM 400% indication on scope. |
| 11. | " | " | " | 4.5MC | " | " | A10 | With volume control at low level, retouch A10 for maximum 400% indication on scope. |

## VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 4.5 volt bias supply to the ungrounded side. of C33. Connect the positive lead to chassis.
Set the fine tuning control to the mid-position of its range.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 12. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 213MC (10MC Swp) | 211.25MC<br>215.75MC | 13 | Vert. Amp. thru 10KΩ to point (A). Low side to chassis. | A13 | Adjust to place sound marker in trap notch as in Fig. 4. Video marker should be at 50%. |
| | | | 207MC (10MC Swp) | 205.25MC<br>209.75MC | 12 | | A14 | |
| | | | 201MC (10MC Swp) | 199.25MC<br>203.75MC | 11 | | A15 | |
| | | | 195MC (10MC Swp) | 193.25MC<br>197.75MC | 10 | | A16 | |
| | | | 189MC (10MC Swp) | 187.25MC<br>191.75MC | 9 | | A17 | |
| | | | 183MC (10MC Swp) | 181.25MC<br>185.75MC | 8 | | A18 | |
| | | | 177MC (10MC Swp) | 175.25MC<br>179.75MC | 7 | | A19 | |
| | | | 85MC (10MC Swp) | 83.25MC<br>87.75MC | 6 | | A20 | |
| | | | 79MC (10MC Swp) | 77.25MC<br>81.75MC | 5 | | A21 | |
| | | | 69MC (10MC Swp) | 67.25MC<br>71.75MC | 4 | | A22 | |
| | | | 63MC (10MC Swp) | 61.25MC<br>65.75MC | 3 | | A23 | |
| | | | 57MC (10MC Swp) | 55.25MC<br>59.75MC | 2 | | A24 | |

# ALIGNMENT INSTRUCTIONS (cont)

## VHF RF AND MIXER ALIGNMENT

Connect bias as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 13. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 207MC (10MC Swp) | 205.25MC 209.75MC | 12 | Vert. Amp. thru 10KΩ to point (B). Low side to chassis. | A25, A26, A27 | Adjust for response similar to Fig. 5. |
| 14. | " | " | 213MC (10MC Swp) | 211.25MC 215.75MC | 13 | " | | Check for response similar to Fig. 5. If markers fall below 70% on any channel make SLIGHT compromise adjustment of A25, A26 and A27 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected. |
| | | | 201MC (10MC Swp) | 199.25MC 203.75MC | 11 | | | |
| | | | 195MC (10MC Swp) | 193.25MC 197.75MC | 10 | | | |
| | | | 189MC (10MC Swp) | 187.25MC 191.75MC | 9 | | | |
| | | | 183MC (10MC Swp) | 181.25MC 185.75MC | 8 | | | |
| | | | 177MC (10MC Swp) | 175.25MC 179.75MC | 7 | | | |
| | | | 85MC (10MC Swp) | 83.25MC 87.75MC | 6 | | | |
| | | | 79MC (10MC Swp) | 77.25MC 81.75MC | 5 | | | |
| | | | 69MC (10MC Swp) | 67.25MC 71.75MC | 4 | | | |
| | | | 63MC (10MC Swp) | 61.25MC 65.75MC | 3 | | | |
| | | | 57MC (10MC Swp) | 55.25MC 59.75MC | 2 | | | |

## UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of the UHF portion of this set is not recommended in the field.

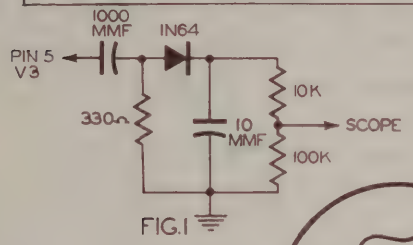


FIG.1

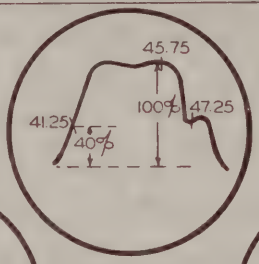


FIG.2

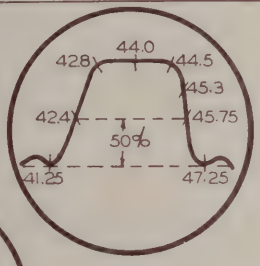


FIG.3

FIG.4

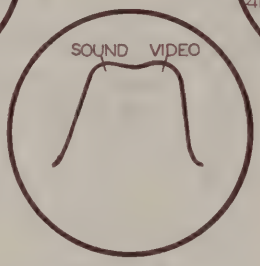
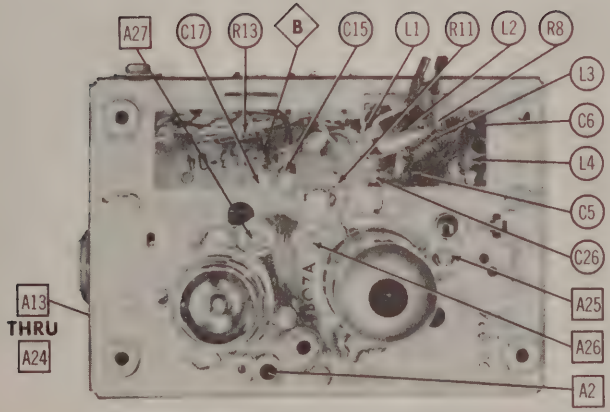
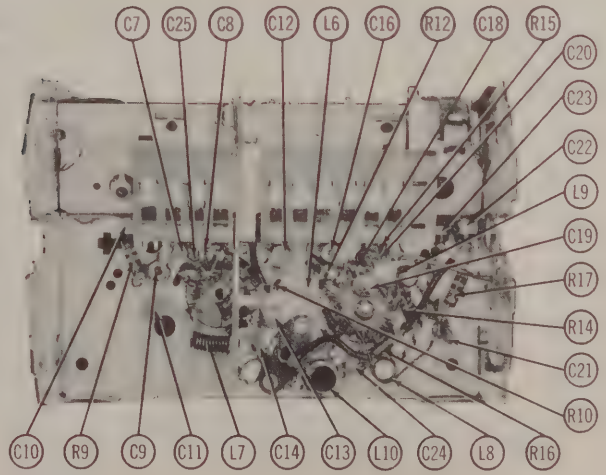


FIG.5



RF TUNER TOP VIEW

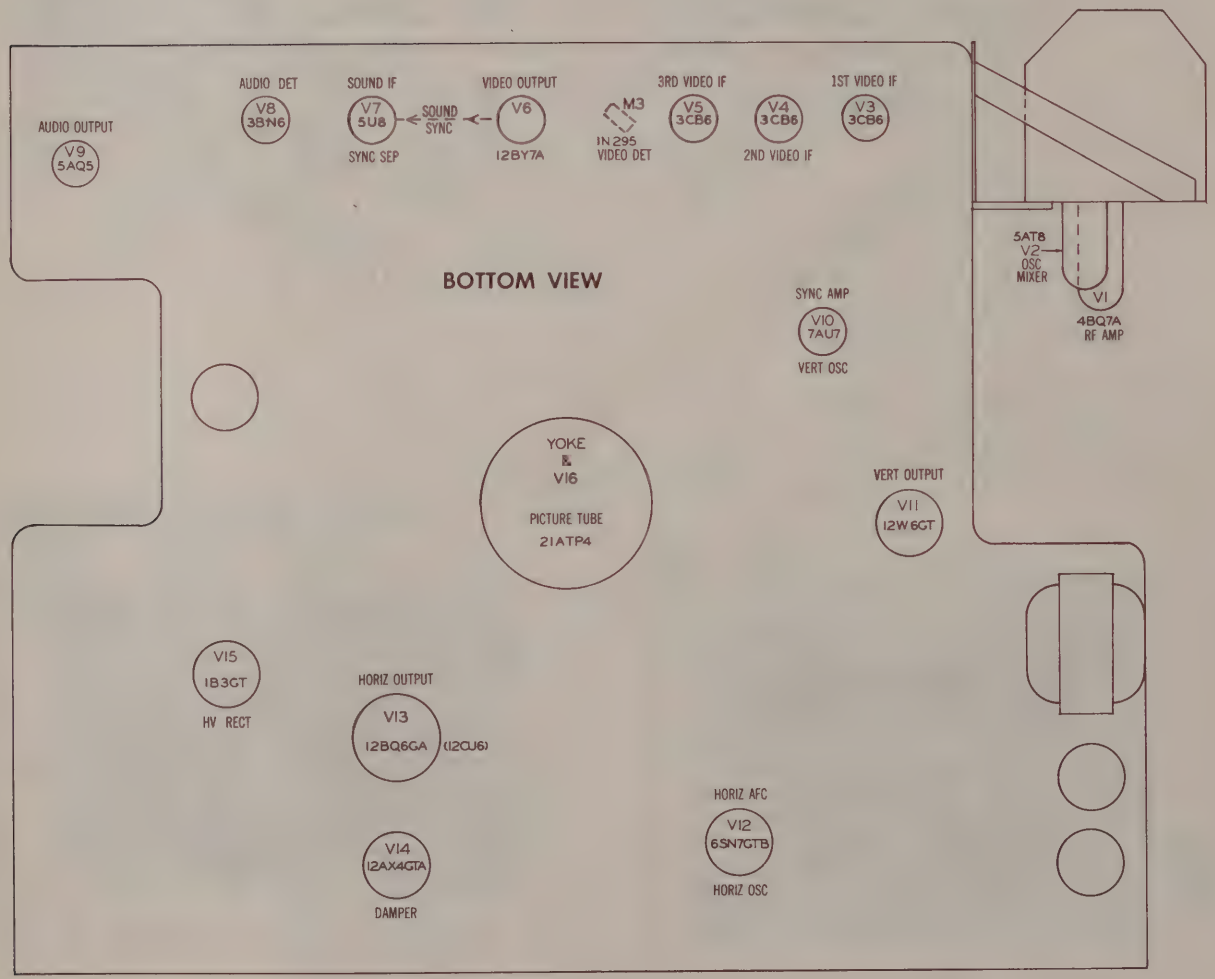


RF TUNER BOTTOM VIEW

# RESISTANCE MEASUREMENTS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 4BQ7A | INF | 3Meg | 0Ω | 5Ω | 4Ω | † 1KΩ | 300KΩ | INF | 0Ω |
| V 2 | 5AT8 | 10KΩ | † 8. 1KΩ | 0Ω | 6Ω | 5Ω | † 18KΩ | † 50KΩ | 0Ω | 220KΩ |
| V 3 | 3CB6 | 1Meg | 47Ω | 6Ω | 7Ω | † 5. 5KΩ | † 5. 5KΩ | 0Ω | | |
| V 4 | 3CB6 | 1Meg | 47Ω | 7Ω | 8Ω | † 5. 5KΩ | † 5. 5KΩ | 0Ω | | |
| V 5 | 3CB6 | . 2Ω | 180Ω | 8Ω | 9Ω | † 3KΩ | † 3KΩ | 0Ω | | |
| V 6 | 12BY7A | 260Ω | 1Meg | 0Ω | 11Ω | 11Ω | 12Ω | † 3. 6KΩ | † 2. 5KΩ | 0Ω |
| V 7 | 5U8 | † 820KΩ | 100KΩ | † 150KΩ | 9Ω | 10Ω | † 85KΩ | 0Ω | 0Ω | 2. 2Meg |
| V 8 | 3BN6 | 250Ω | 3. 6Ω | 3Ω | 4Ω | † 7. 2KΩ | 5. 8Ω | † 330KΩ | | |
| V 9 | 5AQ5 | 50KΩ | 330Ω | 11Ω | 10Ω | † 900Ω | † 550Ω | 50KΩ | | |
| V 10 | 7AU7 | ▲ 2. 5Meg | 1Meg | 220Ω | 12Ω | 12Ω | † 14KΩ | 47KΩ | 0Ω | 13Ω |
| V 11 | 12W6GT | TP | 15Ω | † 450Ω | † 450Ω | 2. 2Meg | NC | 13Ω | 1. 2KΩ | |
| V 12 | 6SN7GTB | 430KΩ | † 56KΩ | 0Ω | 1. 4Meg | † 40KΩ | 400KΩ | 2Ω | 3Ω | |
| V 13 | 12BQ6GA | NC | 17Ω | TP | † 10 KΩ | 470KΩ | TP | 15Ω | 100Ω | TOP CAP ▲ 10Ω |
| V 14 | 12AX4GTA | TP | NC | 1Meg | NC | † 41Ω | NC | 17Ω | 20Ω | |
| V 15 | 1B3GT | | PINS | 1-8 | HAVE | INF | RESISTANCE | | | TOP CAP ▲ 320Ω |
| V 16 | 21ATP4 | 0Ω | 25KΩ | PIN 6 † 100KΩ | PIN 10 ▲ 470KΩ | PIN 11 † 300KΩ | PIN 12 2Ω | | | |

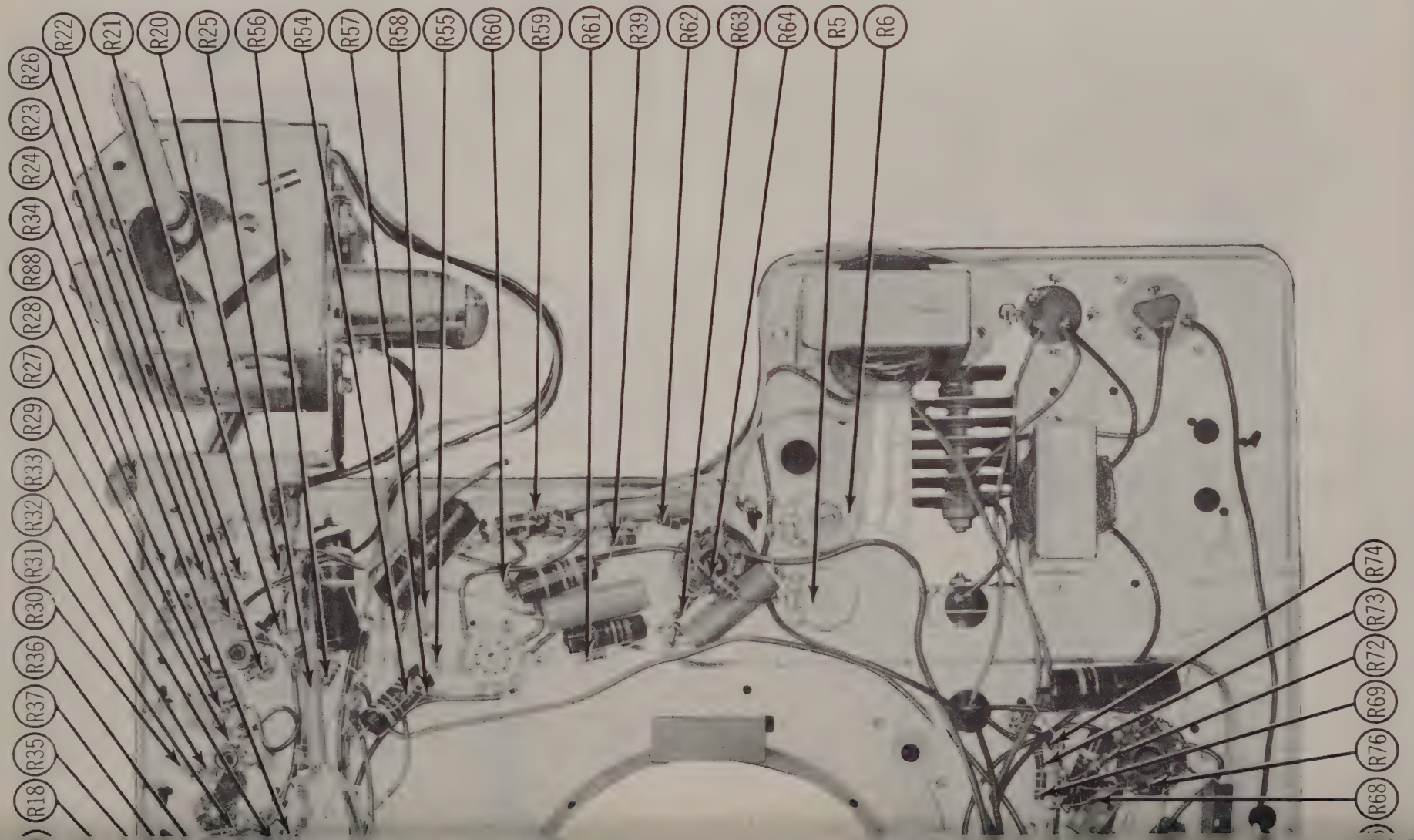
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V14.
TP-TIE POINT.
NC-NO CONNECTION.



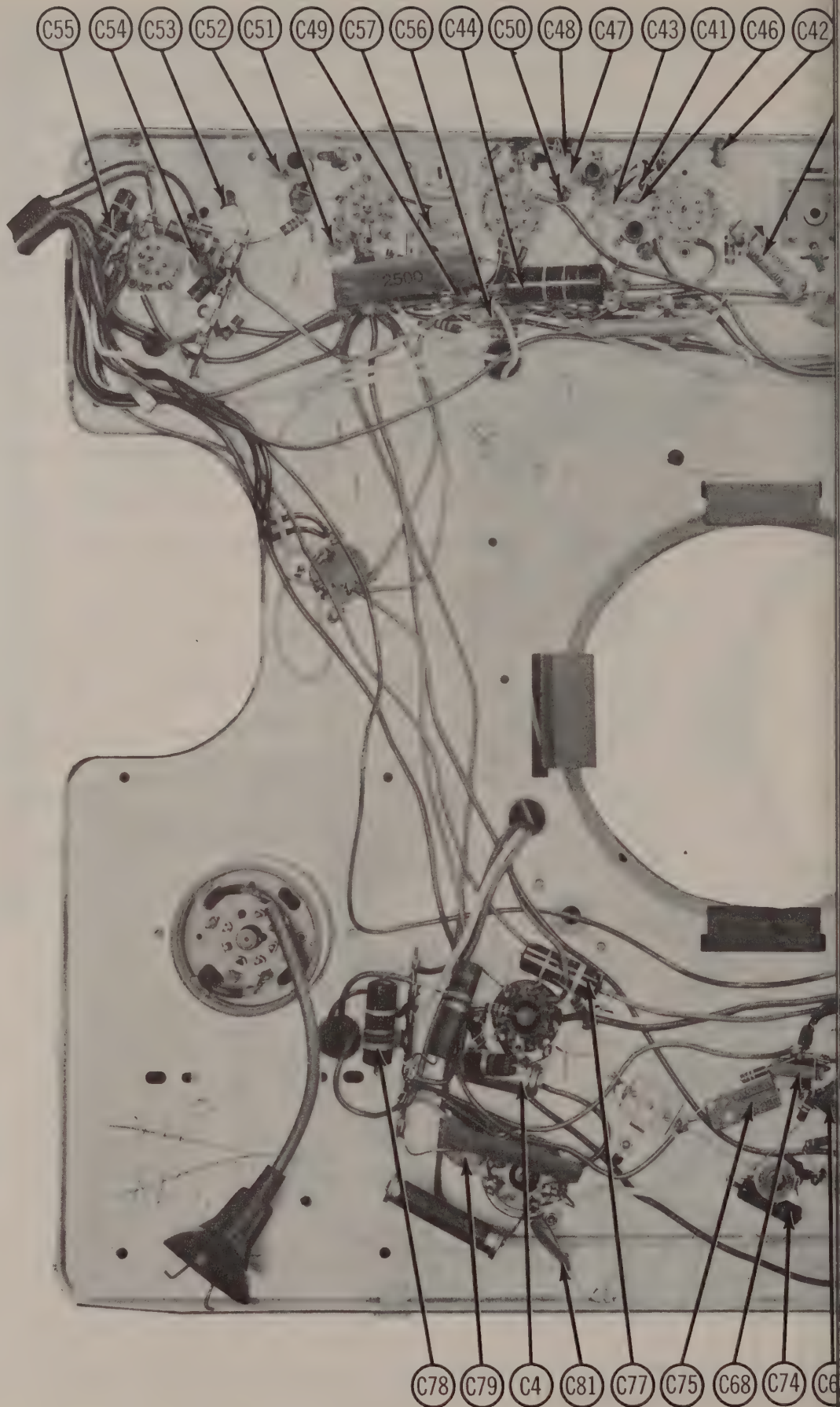

# TUBE PLACEMENT CHART

PROPERTY OF
L. F. DUMONTENSHIP
3[illegible] MIAMI ST.
DENVER, COLORADO

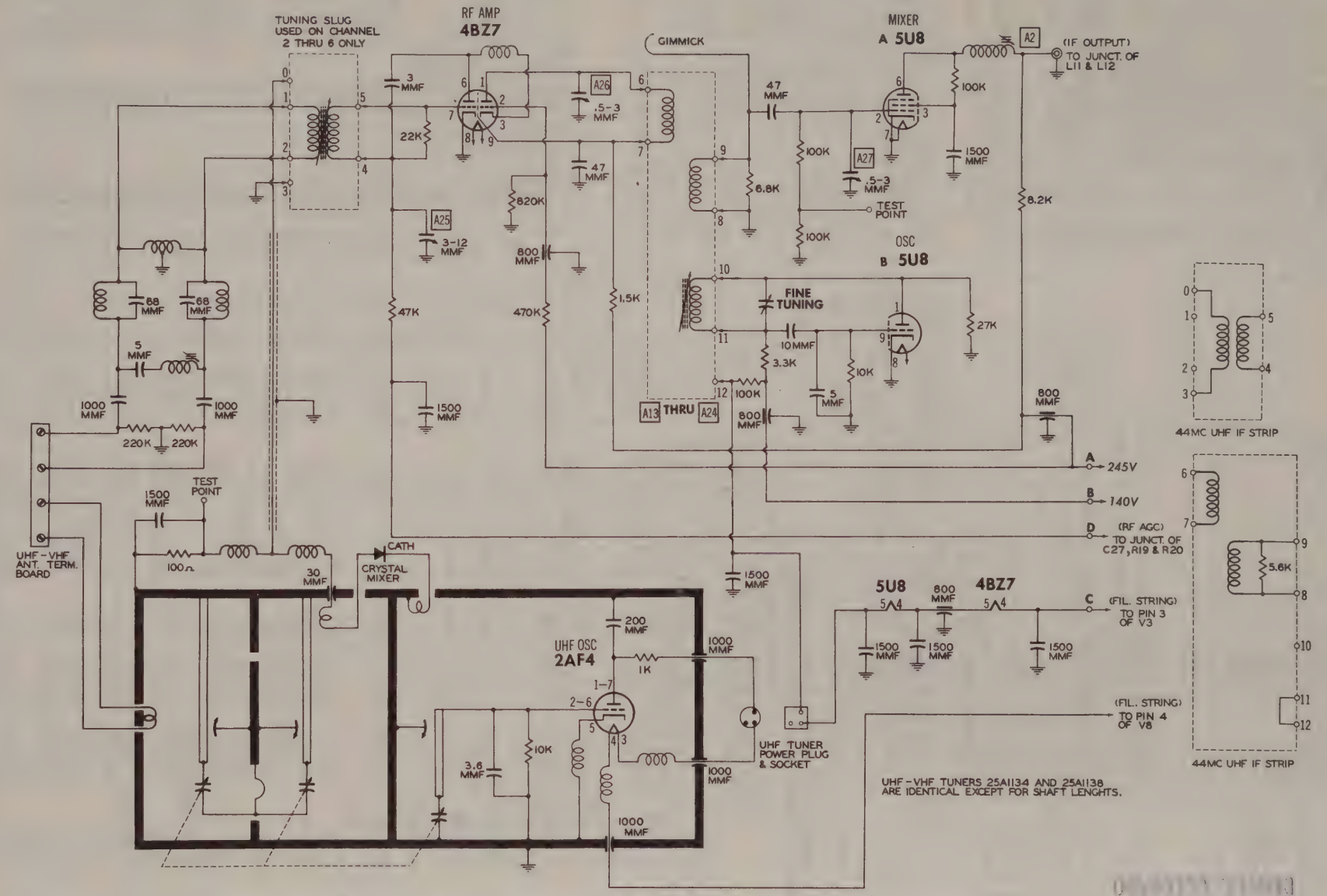





RESISTOR IDENTIFICATION




CHASSIS BOTTOM VIEW-


TUNING SLUG USED ON CHANNEL 2 THRU 6 ONLY
RF AMP 4BZ7
GIMMICK
MIXER A 5U8
OSC B 5U8
(IF OUTPUT) TO JUNCT. OF L11 & L12
FINE TUNING
TEST POINT
A13 THRU A24
A 245V
B 140V
D (RF AGC) TO JUNCT. OF C27, R19 & R20
C (FIL. STRING) TO PIN 3 OF V3
(FIL. STRING) TO PIN 4 OF V8
UHF - VHF ANT. TERM. BOARD
CRYSTAL MIXER
CATH
UHF OSC 2AF4
UHF TUNER POWER PLUG & SOCKET
44MC UHF IF STRIP
44MC UHF IF STRIP
UHF - VHF TUNERS 25A1134 AND 25A1138 ARE IDENTICAL EXCEPT FOR SHAFT LENGHTS.

UHF - VHF TUNER 25A1134 AND 25A1138 USED WITH UHF MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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## ALTERNATE UHF-VHF TUNER SCHEMATIC

**TRUETONE MODELS**

**2D1530A, B, 2D1532A, B, 2D1633A, 2D2530A, B**

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | NOTES |
|---|---|---|---|---|
| V1 | RF Amplifier | 4BQ7A | 4BQ7A | |
| V2 | Mixer-Osc. | 5AT8 | 5AT8 | |
| V3 | 1st. Video IF Amplifier | 3CB6 | 3CB6 | |
| V4 | 2nd. Video IF Amplifier | 3CB6 | 3CB6 | |
| V5 | 3rd. Video IF Amplifier | 3CB6 | 3CB6 | |
| V6 | Video Output | 12BY7A | 12BY7A | |
| V7 | Sound IF Amplifier-Sync Separator | 5U8 | 5U8 | |
| V8 | Audio Detector | 3BN6 | 3BN6 | |
| V9 | Audio Output | 5AQ5 | 5AQ5 | |
| V10 | Sync Amplifier-Vert. Oscillator | 7AU7 | 7AU7 | |
| V11 | Vert. Output | 12W6GT | 12W6GT | |
| V12 | Horiz. AFC-Horiz. Osc. | 6SN7GTB | 6SN7GTB | |
| V13 | Horiz. Output | 12BQ6GA | 12BQ6GA | 12CU6 may be used as an alternate |
| V14 | Damper | 12AX4GTA | 12AX4GTA | |
| V15 | HV Rectifier | 1B3GT | 1B3GT | |

## CATHODE-RAY TUBE

| ITEM No. | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: CBS PART No. | REPLACEMENT DATA: GENERAL ELECTRIC PART No. | REPLACEMENT DATA: SYLVANIA PART No. | NOTES |
|---|---|---|---|---|---|
| V16 | 21ATP4 ①<br>24YP4 ① | 21ATP4 ①<br>24YP4 ① | 21ATP4 ①<br>21ATP4A ①<br>24YP4 ① | 21ATP4 ②<br>24YP4 ② | ① Aluminized<br>② Silver screen "85" |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING: CAP. | RATING: VOLT. | REPLACEMENT DATA: TRUETONE PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1 | ■140 | 150 | 45X421 | AFHS1-70 | XA004 | FP117 | TM-140-150 | S-100 | TVL-1428 |
| C2A | ▲125 | 300 | 45X419 | | B028 | FP218 | TM-12020-300 | D-150 | TVL-2588 |
| B | ■20 | 300 | | | BRH501 | TC3501 | TD-100-50 | MTH-5010 | TVA-1310 |
| C | ▲100 | 50 | | | | | | | |
| C3A | ▲125 | 300 | 45X420 | | | | | Q-221.5 | TVL-4634 |
| B | ■60 | 300 | | | | | | FM-4530 | TVA-1610 |
| C | ▲40 | 50 | | | | | | | |
| C4 | 4 | 50 | (Note 1) | PRS150V4 | BR550 | TC30 | TD-4-50 | MMT-0505 | TVA-1303 |

Note 1. Some versions may use a 5MFD unit (part #45X418) in this application.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: TRUETONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C5 | 120 | | 13L8V12IK | BPD-00012 | D6-121 | TP35 | GP2K-121 | UC-5312 | 5GA-T12 | |
| C6 | 5 | | 13L8C050D | NP0-DI5 | TCZ-4R7 | Z011 | NP0A-050 | ZT-555 | 5TCCB-V47 | |
| C7 | 6.8 | | 13L8C6R81 | NP0-DI6.8 | TCZ-6R8 | Z013 | NP0A-6R8 | ZT-5568 | 5TCCB-V68 | |
| C8 | 6.8 | | 13L8C6R81 | NP0-DI6.8 | TCZ-6R8 | Z013 | NP0A-6R8 | ZT-5568 | 5TCCB-V68 | |
| C9 | 2-10 | | 31B-901 | | 829-10 | | | | | |
| C10 | 800 | | 13M-320EA-102ZC | | | | | | | |
| C11 | 2.2 | | 13L8GP2R2C | NP0-SI2.2 | TCZ-2R2 | Z006 | NP0A-2R2 | | 5TCCB-V22 | |
| C12 | .5-3 | | 31B-902 | | 829-3 | | 3115-01-0R5 | CT565A | | |
| C13 | 1000 | | 13L8X102Z | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C14 | 1.5 | | 13L8C1R5C | NP0-SI1.5 | TCZ-1R5 | Z004 | NP0A-1R5 | ZT-5515 | 5TCCB-V15 | |
| C15 | 800 | | 13M-320EA-102ZC | | | | | | | |
| C16 | .5-3 | | 31B-902 | | 829-3 | | 3115-01-0R5 | CT565A | | |
| C17 | 60 | | 13M-320Q-600J | | | | | | | |
| C18 | 1 | | 13D-111-2 | NP0-SI1 | TCZ-1 | TZ03 | NP0A-010 | | 5TCCB-V1 | |
| C19 | 10 | | 13L8Q100A | | | | | | | |
| C20 | 10 | | 13L8U100D | | | | | | | |
| C21 | 1000 | | 13L8X102Z | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C22 | 800 | | 13M-320EA-102ZC | | | | | | | |
| C23 | 800 | | 13M-320EA-102ZC | | | | | | | |
| C24 | 1000 | | 13L8X102Z | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C25 | 1000 | | 13L8X102Z | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C26 | 800 | | 13M-320EA-102ZC | | | | | | | |
| C27 | 10000 | | 47X595 | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C28 | 47 | | 47X603 | SI47 | D6-470 | TP29 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C29 | 47 | | 47X603 | SI47 | D6-470 | TP29 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C30 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C31 | 680 | | 80X5 | BPD-00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C32 | 56 | | | NP0-SI56 | TCZ-56 | Z036 | NP0-337-560 | | 5TCC-Q56 | |
| C33 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C34 | 680 | | 80X5 | BPD-00068 | DD-681 | K065 | 811-681 | UC-5368 | 5GA-T68 | |
| C35 | 68 | | | NP0-SI68 | TCZ-68 | Z038 | NP0-337-680 | | 5TCC-Q68 | |
| C36 | 560 | | 80X9 | SI560 | DD-561 | G063 | 811-561 | UC-5356 | 5GA-T56 | |
| C37 | 470 | | 80X4 | BPD-00047 | DD-471 | K060 | 831-471 | UC-5347 | 5GA-T47 | |
| C38 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C39 | .47 | 200 | RCP10M2474M | P288N-47 | | CUB2P47 | | PT4047 | 2TM-P47 | |
| C40 | .047 | 200 | RCP10M2473M | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C41 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C42 | 47 | | 47X603 | SI47 | D6-470 | TP29 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C43 | 30 | | 47X669 | | | | | | | |
| C44 | .1 | 400 | RCP10M4104M | P488N-1 | DF-104 | CUB4P1 | | PT401 | 4TM-P1 | |
| C45 | .047 | 200 | RCP10M2473M | BPD-05 | DF-503 | CUB2S47 | | PT4147 | 2TM-S47 | |
| C46 | 1.5 | | 47X584 | NP0-SI1.5 | TCZ-1R5 | TZ04 | NP0A-1R5 | ZT-5515 | 5TCCB-V15 | |
| C47 | 22 | | 47X671 | | | | | | | |
| C48 | 100 | | 80X8 | BPD-0001 | DD-101 | G042 | 801-101 | UC-531 | 5GA-T1 | |
| C49 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C50 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C51A | 1000 | | 80X3 | BPD-2X001 | DD2-102 | DK069 | 812-001 | DCD-521 | 5HK-2D1 | |
| B | 1000 | | | | | | | | | |
| C52 | 15 | | 47X672 | | | | | | | |
| C53 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-D1 | |
| C54 | 5000 | | 47X507 | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C55 | .0047 | 600 | RCP10M6472M | SI4700 | D6-472 | CUB6D47 | GP2-333-472 | PT6247 | 6TM-D47 | |
| C56 | 330 | 500 | 47X570 | 1469-00033 | D6-331 | 5R5T33 | 811-331 | | MS-333 | |
| C57 | 5000 | | 47X507 | BPD-005 | DD-502 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C58 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C59A | 2000 | | | | | | | DC-522 | | |
| B | 5000 | | ♦76X7 | ♦PA-110 | ♦PC-100 | ♦1115TM1 | ♦1405-01 | DC-525 | ♦V-1 | |
| C | 5000 | | | | | | | DC-525 | | |

| ITEM No. | RATING: CAP. | RATING: VOLT | TRUETONE PART No. | AEROVOX PART No. | CENTRALAB PART No. |
|---|---|---|---|---|---|
| C60 | .01 | 400 | RCP10M4103M | BPD-01 | D6-103 |
| C61 | .022 | 200 | RCP10M2223M | BPD-02 | DD-203 |
| C62 | .1 | 600 | RCP10M6104M | P688N-1 | DF-104 |
| C63 | .047 | 600 | RCP10M6473M | BPD-05 | DF-503 |
| C64 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 |
| C65 | .1 | 400 | RCP10M4103M | P488N-1 | DF-104 |
| C66 | 18 | 500 | RCM20B180K | 1469-000018 | D6-180 |
| C67 | 82 | 500 | RCM20B820K | 1469-000082 | D6-820 |
| C68 | 100 | 500 | RCM20B101K | 1469-0001 | D6-101 |
| C69 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 |
| C70 | .047 | 200 | RCP10M2473M | BPD-05 | DF-503 |
| C71 | .022 | 200 | RCP10M2223M | BPD-02 | DD-203 |
| C72 | .47 | 200 | RCP10M2474M | P288N-47 | |
| C73 | 220 | 500 | RCM20B221K | 1469-00022 | D6-221 |
| C74 | .01 | 400 | RCP10M4103M | | |
| C75 | 820 | 500 | RCM25B821K | 1464-00082 | |
| C76 | 220 | | 80X10 | 1469-00022 | D6-221 |
| C77 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 |
| C78 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 |
| C79 | 56 | 5000 | 47X755 | | DD60-560 |
| C80A | 1000 | | 80X3 | BPD-2X001 | DD2-102 |
| B | 1000 | | | | |
| C81 | 10000 | 1500 | 47X615 | | DD1032 |
| C82 | 10000 | 1500 | 47X615 | | DD1032 |
| C83 | 1000 | 1500 | 47X573 | HVD-15-1000 | DD30-102 |

Note 2. Not used in some versions.
♦ Items C59A, C59B, C59C, R58A, R58B and R58C are co

## CONT

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT: TRUETONE PART No. | REPLACEMENT: CENTRALAB PART No. | REPLACEMENT: CLAROST PART N |
|---|---|---|---|---|---|
| R1A | 1000Ω | ½ | 78X22 | F1-4 | |
| B | 1Meg | ½ | | R2-51 | |
| C | Switch | | | KB-1 | |
| R2A | 500KΩ | ½ | 40X294 | AB-59 | A47-500K |
| B | Shaft | | Not Req. | AK-8 * | RS-3/16 * |
| R3A | 1.5Meg | ½ | 40X396 | AB-742 | A47-1.5M |
| B | Shaft | | Not Req. | AK-8 * | RS-3/16 * |
| R4A | 50KΩ | ½ | 40X395 | AB-31 | A47-50K |
| B | Shaft | | Not Req. | AK-8 * | RS-3/16 |
| R5A | 1500Ω | ½ | 40X399 | AB-6 | A47-1500 |
| B | Shaft | | Not Req. | AK-19 | RN-3 |
| R6A | 2.5Meg | ½ | 40X398 | BX-83 | A47-2.5M |
| B | Shaft | | Not Req. | Not Req. | RN-3 |
| R7 | 500Ω | 2 | 40X397 | | 39-500 |

Note 1. Part No. 78X23 used in 21" UHF Models-"A" version.
Note 2. Part No. 40X400 used in 24" Models.
Note 3. Part No. 40X402 used in 24" Models.
Note 4. Part No. 40X401 used in 24" Models.
* Shaft must be filed flat.
♦ Universal Replacement (Mallory Exact Duplicate Part No.
† Concentrikit Equivalent, K-4 Kit, Base Elements & Shafts;

## RESIST

| ITEM No. | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R8 | 680KΩ | ½ | 12TAE684M | | |
| R9 | 4700Ω | ½ | 12TAE472K | BTS-4700 | |
| R10 | 820KΩ | ½ | 12TAE824K | BTS-820K | |
| R11 | 470KΩ | ½ | 12TAE474K | BTS-470K | |
| R12 | 10KΩ | ½ | 12TAE103K | | |
| R13 | 220KΩ | ½ | 12TAE224M | | |
| R14 | 10KΩ | ½ | 12TAE103K | | |
| R15 | 5600Ω | ½ | 12TAE562K | | |
| R16 | 15KΩ | ½ | 12TAE153K | | |
| R17 | 47KΩ | ½ | 12TAE473K | | |
| R18 | 1000Ω | 1 | C85102 | BTA-1000 | |
| R19 | 2.2Meg | ½ | B84225 | BTS-2.2Meg | |
| R20 | 2.2Meg | ½ | B84225 | BTS-2.2Meg | |
| R21 | 1000Ω | ½ | B85102 | BTS-1000 | |
| R22 | 5600Ω | ½ | B85562 | | |
| R23 | 470Ω | ½ | B85471 | BTS-470 | |
| R24 | 47Ω 5% | 4 | B83470 | BTS-47 | |
| R25 | 5000Ω | 4 | 43X332 | PW4-5000 | |
| R26 | 68KΩ | ½ | B84683 | | |
| R27 | 470Ω | ½ | B85471 | BTS-470 | |
| R28 | 47Ω 5% | 4 | B83470 | BTS-47 | |
| R29 | 47KΩ | ½ | | | |
| R30 | 22KΩ | ½ | B84223 | | |
| R31 | 470Ω | ½ | B85471 | BTS-470 | |
| R32 | 180Ω | ½ | B84181 | BTS-180 | |
| R33 | 1Meg | ½ | B84105 | BTS-1Meg | |
| R34 | 3900Ω | ½ | B84392 | BTS-3900 | |
| R35 | 1Meg | ½ | B84105 | BTS-1Meg | |
| R36 | 3600Ω | 4 | 43X331 | | |
| R37 | 47Ω | ½ | B84470 | BTS-47 | |
| R38 | 180KΩ | ½ | B84184 | BTS-180K | |
| R39 | 15KΩ | ½ | B85153 | BTS-15K | |
| R40 | 470KΩ | ½ | B84474 | BTS-470K | |
| R41 | 100KΩ | ½ | B85104 | BTS-100K | |
| R42 | 100KΩ | ½ | B84104 | BTS-100K | |
| R43 | 82KΩ | ½ | B84823 | BTS-82K | |
| R44 | 68KΩ | ½ | B84683 | BTS-68K | |
| R45 | 680Ω | ½ | B84681 | BTS-680 | |
| R46 | 330KΩ | ½ | B84334 | BTS-330K | |
| R47 | 4700Ω | ½ | B84472 | BTS-4700 | |
| R48 | 470Ω | 1 | C85471 | BTA-470 | |
| R49 | 330Ω | 1 | C84331 | BTA-330 | |

Note 1. Some versions use an 82K
Note 2. Temperature compensati
Note 3. Used only in models with
Note 4. Used only in models not
♦ Items R58A, R58B, R58C, C59

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | REPLACEMENT DATA: TRUETONE PART No. | STANDARD REPLACEMENT | NOTES |
|---|---|---|---|---|
| V1 | RF Amplifier | 6BQ7A | 6BQ7A | |
| V2 | Mixer-Osc | 5AT8 | 5AT8 | |
| V3 | 1st. Video IF Amplifier | 3CB6 | 3CB6 | |
| V4 | 2nd. Video IF Amplifier | 3CB6 | 3CB6 | |
| V5 | 3rd. Video IF Amplifier | 3CB6 | 3CB6 | |
| V6 | Video Output | 12BY7A | 12BY7A | |
| V7 | Sound IF Amplifier-Sync Separator | 5U8 | 5U8 | |
| V8 | Audio Detector | 3BN6 | 3BN6 | |
| V9 | Audio Output | 5AQ5 | 5AQ5 | |
| V10 | Sync Amplifier-Vert. Oscillator | 7AU7 | 7AU7 | |
| V11 | Vert. Output | 12W6GT | 12W6GT | |
| V12 | Horiz.-AFC-Horiz. Osc. | 6SN7GTB | 6SN7GTB | |
| V13 | Horiz. Output | 12BQ6GA | 12BQ6GA | 12CU6 may be used as an alternate |
| V14 | Damper | 12AX4GTA | 12AX4GTA | |
| V15 | HV Rectifier | 1B3GT | 1B3GT | |

## CATHODE-RAY TUBE

| ITEM No. | REPLACEMENT DATA: TRUETONE PART No. | CBS PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | NOTES |
|---|---|---|---|---|---|
| V16 | 21ATP4 ① | 21ATP4 ① | 21ATP4 ①<br>21ATP4A ① | 21ATP4 ① | ① Aluminized ② Silver screen "B" |
| | 24TP4 ① | 24TP4 ① | 24TP4 ① | 24TP4 ① | |

## ELECTROLYTIC CAPACITORS

| ITEM No | RATING: CAP | VOLT | REPLACEMENT DATA: TRUETONE PART No. | AEROVOX PART No. | CORNELL DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1 | ■140 | 150 | 45X421 | AA004 | AFH51-70 | FP1JT | TM-140-150 | S-100 | TVL-1438 |
| C2A | ■125 | 300 | 40X419 | BQ28 | | FP2JB | TM-12020-300 | D-150 | TVL-2588 |
| B | ■20 | 300 | | BRH501 | | TC3501 | TD-100-50 | MTH-5010 | TVA-1310 |
| C | ■100 | 50 | | | | | | | |
| C3A | ■125 | 300 | 45X420 | | | | | Q-321.5 | TVL-4634 |
| B | ■50 | 300 | | | | | | FM-4320 | TVA-1850 |
| C | ■40 | 50 | | | | | | | |
| C4 | 4 | 50 | (Note 1) | PRS150V4 | BR550 | TC20 | TD-4-50 | MMT-0501 | TVA-1303 |

Note 1. Some versions may use a 5MFD unit (part #45X418) in this application.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | VOLT | REPLACEMENT DATA: TRUETONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL DUBILIER PART No. | ERIE PART No | MALLORY PART No | SPRAGUE PART No | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C5 | 120 | | 13LBV12LK | BPD-00012 | D6-121 | TP25 | GP2K-121 | UC-5312 | 5GA-T12 | |
| C6 | 5 | | 13LBC050D | NPO-D15 | TCZ-5RT | 2012 | NP0A-050 | ZT-555 | 5TCCB-V47 | |
| C7 | 6.8 | | 13LBC68K | NPO-D68.8 | TCZ-5R8 | 2013 | NP0A-6R8 | ZT-5568 | 5TCCB-V68 | |
| C8 | 6.8 | | 13LBC6R8I | NPO-D68.8 | TCZ-5R8 | 2013 | NP0A-6R8 | ZT-5568 | 5TCCB-V68 | |
| C9 | ≥100 | 50 | | | S2B-LD | | | | | |
| C10 | 800 | | 13M-320EA-1032C | | | | | | | |
| C11 | 3.2 | | 13LBGP2R3C | NPO-S12.2 | TCZ-2R2 | 2006 | NP0A-2R2 | | 5TCCB-V22 | |
| C12 | .5-3 | | 31B-902 | | S29-3 | | 31S-01-0R5 | CT565A | | |
| C13 | 1000 | | 13LBX102Z | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C14 | 1.5 | | 13LBC1R5C | NPO-S11.5 | TCZ-1R5 | 2004 | NP0A-1R5 | ZT-5515 | 5TCCB-V15 | |
| C15 | 800 | | 13M-320EA-1032C | | | | | | | |
| C16 | .5-3 | | 31B-902 | | S29-3 | | 31S-01-0R5 | CT565A | | |
| C17 | 80 | | 13M-320Q-800J | | | | | | | |
| C18 | 1 | | 13D-111-2 | NPO-S11 | TCZ-1 | T203 | NP0A-010 | | 5TCCB-V1 | |
| C19 | 10 | | 13LBQ10A | | | | | | | |
| C20 | 10 | | 13LBU10D | | | | | | | |
| C21 | 1000 | | 13LBX102Z | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C22 | 800 | | 13M-320EA-1032C | | | | | | | |
| C23 | 800 | | 13M-320EA-1032C | | | | | | | |
| C24 | 1000 | | 13LBX102Z | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C25 | 1000 | | 13LBX102Z | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C26 | 800 | | 13M-320EA-1032C | | | | | | | |
| C27 | 10000 | | 47X585 | BPD-01 | DD-103 | K082 | 811-01 | DC-511 | 5HK-S1 | |
| C28 | 47 | | 47X603 | S147 | D6-470 | TP29 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C29 | 47 | | 47X603 | S147 | D6-470 | TP29 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C30 | 1000 | | 80X1 | BPD-001 | DD-103 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C31 | 680 | | 80X5 | BPD-00068 | DD-681 | K085 | 811-681 | UC-5368 | 5GA-T68 | |
| C32 | 56 | | | BPD-S158 | TCZ-5S6 | 2035 | NP0-537-560 | | 5TCC-Q56 | |
| C33 | 1000 | | 80X1 | BPD-001 | DD-103 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C34 | 680 | | 80X5 | BPD-00068 | DD-681 | K085 | 811-681 | UC-5368 | 5GA-T68 | |
| C35 | 68 | | | BPD-S168 | TCZ-6S | 2033 | NP0-537-680 | | 5TCC-Q68 | |
| C36 | 560 | | 80X9 | S1560 | DD-561 | G083 | 811-561 | UC-5356 | 5GA-T56 | |
| C37 | 470 | | 80X4 | BPD-00047 | DD-471 | K060 | 811-471 | UC-5347 | 5GA-T47 | |
| C38 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C39 | .47 | 200 | RCP10M2474M | P288N-47 | | | CUB2P47 | P1Y047 | 3TM-P47 | |
| C40 | .047 | 200 | RCP10M4743M | BPD-05 | DF-503 | | CUB4S47 | P1Y447 | 3TM-S47 | |
| C41 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C42 | 47 | | 47X603 | S147 | D6-470 | TP29 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C43 | 20 | | 47X569 | | | | | | | |
| C44 | .1 | 400 | RCP10M1044M | P488N-1 | DP-104 | CUB4P1 | | P7401 | 4TM-P1 | |
| C45 | .047 | 200 | RCP10M4743M | BPD-05 | DF-503 | CUB2S47 | | P1Y447 | 3TM-S47 | |
| C46 | 1.5 | | 47X584 | NPO-S11.5 | TCZ-1R5 | T204 | NP0A-1R5 | ZT-5515 | 5TCCB-V15 | |
| C47 | 33 | | 47X571 | | | | | | | |
| C48 | 1000 | | 80X8 | BPD-0001 | DD-101 | G042 | 801-101 | UC-531 | 5GA-T1 | |
| C49 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C50 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C51A | 1000 | | 80X3 | BPD-2X001 | DD2-102 | DK069 | 812-001 | DCD-521 | 5HK-2D1 | |
| B | 1000 | | | | | | | | | |
| C52 | 15 | | 47X572 | | | | | | | |
| C53 | 1000 | | 80X1 | BPD-001 | DD-102 | K069 | 801-001 | DC-521 | 5HK-DI | |
| C54 | 5600 | | 47X507 | BPD-005 | DD-562 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C55 | .0047 | 600 | RCP10M5472M | S14700 | D6-472 | CUB5D47 | GP2-333-472 | PT5247 | 6TM-D47 | |
| C56 | 330 | 500 | 47X570 | 1469-00033 | D6-331 | 5R5T33 | 811-331 | | M5-333 | |
| C57 | 5600 | | 47X507 | BPD-005 | DD-562 | K080 | 811-005 | DC-525 | 5HK-D5 | |
| C58 | .047 | 400 | RCP10M4743M | BPD-05 | DF-503 | CUB4S47 | | P1Y447 | 4TM-S47 | |
| C59A | 3000 | | ■7EX7 | ■PA-110 | ■PC-100 | ■1157M1 | ■1405-01 | DC-522 | ■V-1 | |
| B | 1000 | | | | | | | DC-525 | | |
| C | 5000 | | | | | | | DC-525 | | |

## CAPACITORS (cont)

| ITEM No | RATING: CAP | VOLT | REPLACEMENT DATA: TRUETONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C60 | .01 | 400 | RCP10M4103M | BPD-01 | D6-103 | CUB4S1 | GP3-333-103 | PT411 | 4TM-S1 | |
| C61 | .022 | 200 | RCP10M2223M | BPD-02 | DD-203 | CUB4S22 | 817-02 | PT4122 | 4TM-S22 | |
| C62 | .1 | 600 | RCP10M6104M | P688N-1 | DF-104 | CUB6P1 | | PT601 | 6TM-P1 | |
| C63 | .047 | 600 | RCP10M6473M | BPD-05 | DF-503 | CUB6S47 | | PT6147 | 6TM-S47 | |
| C64 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C65 | .1 | 400 | RCP10M4104M | P488N-1 | DF-104 | CUB4P1 | | PT401 | 4TM-P1 | |
| C66 | 18 | 500 | RCM20B180K | 1469-00018 | D6-180 | 5R5QH | 831-180 | | M5-418 | |
| C67 | 82 | 500 | RCM20B820K | 1469-00082 | D6-820 | 5R5QH2 | 831 826 | | M5-482 | |
| C68 | 100 | 500 | RCM20B101K | 1469-0001 | D6-101 | 5R5T1 | 801 101 | MC8235 | MS-31 | |
| C69 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C70 | .047 | 200 | RCP10M2473M | BPD-05 | DF-503 | CUB2S47 | | PT2147 | 4TM-S47 | |
| C71 | .022 | 200 | RCP10M2223M | BPD-02 | DD-203 | CUB4S22 | 817-02 | PT4122 | 4TM-S22 | |
| C72 | .47 | 200 | RCP10M2474M | P288N-47 | | CUB2P47 | | PT2047 | 2TM-P47 | |
| C73 | 220 | 500 | RCM20B221K | 1469-00022 | D6-221 | 5R5T22 | 811-221 | MC8240 | MS-322 | |
| C74 | .01 | 400 | RCP10M4103M | | | | | | 4TM-S1 | |
| C75 | 82 | 500 | RCM20B820K | 1464-00082 | | 5R5T82 | 831-821 | | MS-382 | |
| C76 | 220 | | 80X10 | 1469-00022 | D6-221 | 5R5T22 | 811-221 | MC8540 | MS-322 | Note 2 |
| C77 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 | 47M-S47 | | PT4147 | 4TM-S47 | |
| C78 | .047 | 400 | RCP10M4473M | BPD-05 | DF-503 | 47M-S47 | | PT4147 | 4TM-S47 | |
| C79 | 56 | 5000 | 47X566 | | D2D0-560 | | | | TSGA-Q56 | |
| C80A | 1000 | | 80X3 | BPD-2X001 | DD2-102 | DK069 | 812-001 | DCD-521 | 5HK-2D1 | |
| B | 1000 | | | | | | | | | |
| C81 | 10000 | 1500 | 47X615 | | DD1032 | | | | | |
| C82 | 10000 | 1500 | 47X615 | | DD1032 | | | | | |
| C83 | 1000 | 1500 | 47X573 | HVD-15-1000 | DD30-102 | MCD1 | 1R5KV-103 | DC-3031 | 20GA-D1 | |

Note 2. Not used in some versions.
■ Items C58A, C59B, C59C, B58A, R58B and R58C are combined in one unit.

## CONTROLS

| ITEM No | RATING: RESISTANCE | WATTS | REPLACEMENT DATA: TRUETONE PART No | CENTRALAB PART No | CLAROSTAT PART No | IRC PART No | MALLORY PART No | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 1000Ω | ½ | 78X23 | P1-4 | | † Q7-885 | UF15L | Contrast (Panel) Note 1 |
| B | 1Meg | ½ | | B2-51 | | | UB1EL ◆ | Volume (Rear) |
| C | Switch | | | KB-1 | | | US-27 | Attach to R1B. |
| R2A | 500KΩ | ½ | 40X294 | AA-59 | A47-500K-S | Q11-133 | U-50 | Brightness Note 2 |
| B | Shaft | | Not Req. | AK-8 * | NQ | D8-37 * | U-55 | Attach to R2A. |
| R3A | 1.5Meg | ½ | 40X398 | AB-742 | A47-1.5Meg-S | Q11-138 | U-155 | Vertical Hold-Note 3 |
| B | Shaft | | Not Req. | AK-8 * | NQ | D8-37 * | U-55 | Attach to R3A. |
| R4A | 50KΩ | ½ | 40X395 | AB-21 | A47-50K-S | Q11-123 | U-35 | Horizontal Hold-Note 4 |
| B | Shaft | | Not Req. | AK-8 * | NQ | D8-37 * | U-55 | Attach to R4A. |
| R5A | 1500Ω | ½ | 40X399 | AB-6 | A47-1500-S | Q11-109 | TAP-1521, | Vertical Linearity |
| B | Shaft | | Not Req. | AK-19 | RN-3 | TQ | Not Req. | Attach to R5A. |
| R6A | 2.5Meg | ½ | 40X396 | BX-43 | A47-2.5Meg-S | Q11-239 | SU-565 | Height |
| B | Shaft | | Not Req. | Not Req. | RN-3 | TQ | Not Req. | Attach to R6A. |
| R7 | 5000 | 2 | 40X397 | | 39-500 | | | Buss (Wire Wound) |

Note 1. Part No. 19X23 used in 21" UHF Models-"A" version, and 24" Models.
Note 2. Part No. 40X400 used in 24" Models.
Note 3. Part No. 40X402 used in 24" Models.
Note 4. Part No. 40X401 used in 24" Models.
* Shaft must be filed flat.
◆ Universal Replacement (Mallory Exact Duplicate Part No. UE54S).
† Concentrist Equivalent, K-4 Kit, Base Elements & Shafts: Bil-108, P6- 200 (Panel)
Bil-137, Bil-218 (Rear)
T6-2 Switch

## RESISTORS

| ITEM No. | RATING: OHMS | WATT | REPLACEMENT DATA: TRUETONE PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R8 | 680KΩ | 1 | 12TAE684M | | |
| R9 | 470Ω | 1 | 12TAE472K | BTS-470Ω | |
| R10 | 820KΩ | 1 | 12TAE824K | BTS-820K | |
| R11 | 470KΩ | 1 | 12TAE474K | BTS-470K | |
| R12 | 10KΩ | 1 | 12TAE103K | | |
| R13 | 330KΩ | 1 | 12TAE334M | | |
| R14 | 10KΩ | 1 | 12TAE103K | | |
| R15 | 56KΩ | 1 | 12TAE563K | | |
| R16 | 1MΩ | 1 | 12TAE105K | | |
| R17 | 47KΩ | 1 | 12TAE473K | | |
| R18 | 1000Ω | 2 | C83102 | BTA-1000 | |
| R19 | 2.2Meg | ½ | B84225 | BTS-2.2Meg | |
| R20 | 2.2Meg | ½ | B84225 | BTS-2.2Meg | |
| R21 | 100Ω | ½ | B83102 | BTS-100 | |
| R22 | 5600Ω | ½ | B85562 | | |
| R23 | 470Ω | ½ | B85471 | BTS-470 | |
| R24 | 470 5% | ½ | B83470 | BTS-47 | |
| R25 | 5000Ω | 4 | 43X332 | PW4-5000 | |
| R26 | 68KΩ | ½ | B84683 | | |
| R27 | 470Ω | ½ | B85471 | BTS-470 | |
| R28 | 470 5% | ½ | B83470 | BTS-47 | |
| R29 | 47KΩ | ½ | | | |
| R30 | 22KΩ | ½ | B84223 | | |
| R31 | 470Ω | ½ | B85471 | BTS-470 | |
| R32 | 180Ω | ½ | B84181 | BTS-180 | |
| R33 | 1MΩ | ½ | B84105 | BTS-1Meg | |
| R34 | 3900Ω | ½ | B84392 | BTS-3900 | |
| R35 | 1Meg | ½ | B84105 | BTS-1Meg | |
| R36 | 150Ω | ½ | 43X231 | | |
| R37 | 47Ω | ½ | B84470 | BTS-47 | |
| R38 | 180KΩ | ½ | B84184 | BTS-180K | |
| R39 | 15KΩ | ½ | B85153 | BTS-15K | |
| R40 | 470KΩ | ½ | B84474 | BTS 470K | |
| R41 | 100KΩ | ½ | B85104 | BTS-100K | |
| R42 | 100KΩ | ½ | B84104 | BTS-100K | |
| R43 | 82KΩ | ½ | B84823 | BTS-82K | |
| R44 | 68KΩ | ½ | B84683 | BTS-68K | |
| R45 | 680Ω | ½ | B84681 | BTS-680 | |
| R46 | 330KΩ | ½ | B84334 | BTS-330K | |
| R47 | 4700Ω | ½ | B84472 | BTS-4700 | |
| R48 | 470Ω | 1 | C85471 | BTA-470 | |
| R49 | 330Ω | 1 | C84331 | BTA-330 | |

| ITEM No. | RATING: OHMS | WATT | REPLACEMENT DATA: TRUETONE PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R50 | 22KΩ | ½ | B84223 | BTS-22K | |
| R51 | 150KΩ | ½ | B84154 | BTS-150K | |
| R52 | 2.2Meg | ½ | B84225 | BTS-2.2Meg | |
| R53 | 820KΩ | ½ | B84824 | BTS-820K | |
| R54 | 680KΩ | ½ | B84684 | BTS-680K | |
| R55 | 47KΩ | ½ | B84473 | BTS-47K | |
| R56 | 4700Ω | ½ | B84472 | BTS-4700 | |
| R57 | 6800Ω | ½ | B84682 | BTS-6800 | |
| R58A | 220KΩ | | | BTS-220K | |
| B | 8200Ω | | + 76X7 | BTS-8200 | |
| C | 82000 | | | BTS-82000 | |
| R59 | 680KΩ | ½ | B84684 | BTS-680K | |
| R60 | 1Meg | ½ | B84105 | BTS-1Meg | |
| R61 | 22KΩ | ½ | B84223 | BTS-22K | |
| R62 | 8200Ω | ½ | B84823 | BTS-8200 | |
| R63 | 2.2Meg | ½ | B84225 | BTS-2.2Meg | |
| R64 | 680Ω | ½ | C84681 | BTA-680 | |
| R65 | 560Ω | ½ | | | |
| R66 | 560Ω | ½ | | | |
| R67 | 220KΩ | ½ | B84224 | | |
| R68 | 330KΩ | ½ | B84334 | | |
| R69 | 820KΩ | ½ | B84824 | | |
| R70 | 120KΩ | ½ | B84124 | | |
| R71 | 47KΩ | ½ | B84473 | | |
| R72 | 82KΩ | ½ | B84823 | | |
| R73 | 330KΩ | ½ | B84334 | | |
| R74 | 3900Ω | ½ | B84392 | | |
| R75 | 22KΩ | ½ | B84223 | | |
| R76 | 100KΩ | ½ | B84104 | | |
| R77 | 1Meg | ½ | B84105 | | |
| R78 | 56KΩ | ½ | B84563 | | |
| R79 | 68Ω | 1 | B85680 | | |
| R80 | 470KΩ | 1 | B84474 | | |
| R81 | 10KΩ | 2 | C84103 | | |
| R82 | 100Ω | 2 | C84101 | | |
| R83 | 5600Ω | ½ | B85562 | | |
| R84 | 250Ω | 10 | 43X281 | 1 3/4A-250Ω | |
| R85 | 30Ω | | 43X329 | | |
| R86 | 250 | 10 | 43X290 | 1 3/4A-25 | |
| R87 | 6.5Ω | 20 | 43X293 | | |
| R88 | 270KΩ | ½ | B84274 | BTS-270K | |
| R89 | 7.5Ω | 9 | 43X380 | | |

Note 1. Some versions use an 82KΩ ½W resistor in this application.
Note 2. Temperature compensating resistor.
Note 3. Used only in models with thermal type circuit breaker.
Note 4. Used only in models not using thermal type circuit breaker.
◆ Items R58A, R58B, R58C, C58A, C58B, C58C are combined in one unit.

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No | USE | REPLACEMENT DATA: TRUETONE PART No. | Hallderson PART No. | Merit PART No. TYPE No | RCA PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|
| T1 | Vert. Osc. Trans. | 54X10 | B6702 | A-3003 | 20VT1 | V405 | A-8125 | 28A03 | A-97X |
| T2 | Horiz. Output Trans. | 53X350 | F8410 * | HVO-26 * | 23DT1 * | X094 * | A-8253 * | F1Y-16 * | D-50 * |
| T3 | Vert. Output Trans. | 51X173 | Z1900 ③ | A-2823 ① | | V302 ① | A-8142 ① | 28G72 ① | A-108X ① |
| T4A | Yoke(90°)Horiz.(25MH) | 9A2373-1 ④ | | | | | | | |
| B | Vert. (13MH) | 2A435 ⑤ | | | | | | | |

1 Drill new mounting holes.
2 Use 8 to 1 turns ratio
3 Connect as auto transformer
4 Includes resistors R65 and R66
5 Yoke rear cover and centering device

### *HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

| ORIGINAL TERMINAL (CONNECTIONS) | Hallderson Replacement Connections | RCA Replacement Connections | Merit Replacement Connections | Stancor Replacement Connections | Thordarson Replacement Connections | Triad Replacement Connections |
|---|---|---|---|---|---|---|
| 4 | 9 | 9 | 9 | 8 | 9 | 9 |
| 3 | 7 or 5 | 7 or 5 | 7 or 5 | 7 or 5 | 7 or 5 | 7 or 5 |
| 2 | N.C. See Note ⑤ | N.C. See Note ⑤ | N.C. See Note ⑤ | 2 | N.C. See Note ⑤ | N.C. See Note ⑤ |
| 1 | 1 | 1 | 1 | 4 | 1 | 1 |
| Special Note: — | ⑥ | ⑥ | ⑥ | ⑥ | ⑥ | ⑥ |

⑤ Install new damping network consisting of approximately 100MMF @ 2KV, and 3000Ω @ ½W, connected in series across terms #3 and #7 of hi riser wire

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No | IMPEDANCE: PRI | SEC | REPLACEMENT DATA: TRUETONE PART No. | Hallderson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T5 | 3.5KΩ | 3-4Ω | 51X174 | Z1901 ① | A3018 ① | A3849 ① | 24S81 ① | S-51X ① | ① Drill new mounting hole |

## SPEAKER

| ITEM No. | RATINGS: SIZE | FIELD | V C | IMP. | REPLACEMENT DATA: TRUETONE PART No. | QUAM PART No. | RCA TYPE No | NOTES |
|---|---|---|---|---|---|---|---|---|
| SP1 | 5" | PM | 3-4Ω | | 12A527 | 5A07 | 20S82 ① | ① Used in some versions |
| | 6" | PM | 2-4Ω | | 12A528 ① | 6A1 | 22S61 | |
| | 8" | PM | 3-4Ω | | 12A522 ① | 8A21 | 20S82 | |

## COILS (RF-IF)

| ITEM No. | USE | DC RES: PRI | SEC | REPLACEMENT DATA: TRUETONE PART No. | MEISSNER PART No | MERIT PART No | MILLER PART No | NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | Ant. Matching Trans. | 0Ω | 0Ω | 3ITA-413 | | | | |
| L2 | Ant. Matching Trans. | 0Ω | 0Ω | 3ITA-413 | | | | |
| L3 | FM Trap | 0Ω | | 3IT-417 | | | | |
| L4 | IF Trap Coil | .2Ω | | 3IT-418-01 | | | | |
| L5A | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-303-D | | | | Channel 2 |
| B | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-303-D | | | | Channel 3 |
| C | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-304-D | | | | Channel 4 |
| D | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-305-D | | | | Channel 5 |
| E | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-306-D | | | | Channel 6 |
| F | Ant., RF, M Mixer Grid, Osc. Coils | 0Ω | | 31M-307-D | | | | Channel 7 |
| G | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-308-D | | | | Channel 8 |
| H | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-309-D | | | | Channel 9 |
| I | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-310-D | | | | Channel 10 |
| J | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-311-D | | | | Channel 11 |
| K | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-312-D | | | | Channel 12 |
| L | Ant., RF, Mixer Grid, Osc. Coils | 0Ω | | 31M-313-D | | | | Channel 13 |
| L6 | Fil. Choke | 0Ω | | 34A-732 | | | | |
| L7 | Neut. Coil | 0Ω | | 31B-727 | | | | |
| L8 | RF Coil | 0Ω | | 35A-154-01 | | | | |
| L9 | RF Coil | 0Ω | | | | | | |
| L10 | Conv. Plate | .1Ω | | 31UA-505 | | | | |
| L11 | 39MC Trap | .1Ω | | 9A2389 | | TV-152 | 6235 | |
| L12 | 1st Video IF | .1Ω | | 9A2365 | | TV-151 | 6235 | |
| L13 | 2nd Video IF | .2Ω | .2Ω | 9A2363 | | | 6223 | Includes 47.25MC Trap |
| L14 | 3rd Video IF | .2Ω | .2Ω | 9A2364 | | | 6221 | Includes 41.25MC Trap. R29 and C35 |
| L15 | Series Peaking Coil | 5Ω | | 9A2375 | | 19-3036 | TV-180 | 6178 | 30 Microhenries |
| L16 | Shunt Peaking Coil | 12.5Ω | | 38A12 | | 19-4180 | TV-184 * | 6120 * | 180 Microhenries, Wound on 2KΩ resistor |
| L17 | 4.5MC Trap | 3.2Ω | | 9A2368 | | 30-1004 | TV-181 | 1468 | 230 Microhenries, |
| L18 | Series Peaking Coil | 2Ω | | 38A28 | | 19-4400 ▲ | TV-190 ▲ | 6122 ▲ | Wound on 6.8KΩ resistor |

# PARTS LIST AND DESCRIPTIONS (Continued)

## COILS (cont)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA: TRUETONE PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| L19 | Shunt Peaking Coil | 16Ω | | 36A33 | 19-3250 ▲ | TV-185 ▲ | 6181 ▲ | 225 Microhenries, Wound on 2.2KΩ resistor |
| L20 | 1st Sound IF | 3.2Ω | | 9A2366 | 20-1004 | TV-151 | 1469 | |
| L21 | 2nd Sound IF | 3.6Ω | 3.6Ω | 9A2368 | 17-3495 | TV-113 | 6203 | |
| L22 | Quadrature Coil | 5.8Ω | | 9A2367 | 20-1005 | | 1480 | |
| L23 | RF Choke | .1Ω | | 9A2380 | 19-1001 | | 4604 | 1.5 Microhenries |

* Parallel with 22KΩ resistor.
◓ Parallel with 6.8KΩ resistor.
▲ Parallel with 2.2KΩ resistor.

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA: TRUETONE PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | RCA TYPE No. | Ram PART No. | Thordarson PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| L24 | 77Ω | | 9A2372 | | | 6211 ■ | | | | Tapped @ 53Ω- Horiz. Osc. Horiz. Waveform |
| L25 | 60Ω | | 9A2371 | | | | | | | |

■ Enlarge mounting hole.

## FILTER CHOKE

| ITEM No. | RATINGS: TOTAL DIRECT CURRENT | RATINGS: D.C. RESISTANCE | RATINGS: INDUCTANCE (0 CURRENT 1000 ∿) | REPLACEMENT DATA: TRUETONE PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|
| L26 | .255A | 41Ω | 1HY | 52X95-2 | C5037 ① | C2996 ① | C2326 ① | 26C41 | C-17X ① |

① Drill one new mounting hole.

## SELENIUM RECTIFIER

| ITEM No. | RATING: CURRENT | REPLACEMENT DATA: TRUETONE PART No. | FEDERAL PART No. | INTERNATIONAL PART No. | MALLORY PART No. | RADIO RECEPTOR PART No. | SARKES TARZIAN PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| M1 | .255ADC | 66X14 | 1236A | MR300 | 6S300 | 6Q4 | 300 | |
| M2 | .255ADC | 66X14 | 1236A | MR300 | 6S300 | 6Q4 | 300 | |

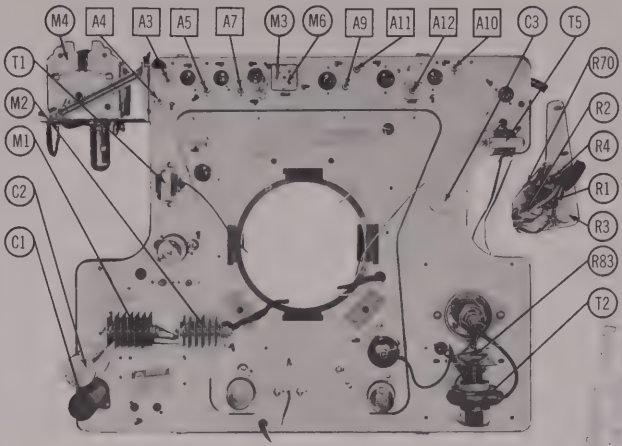
## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: SYLVANIA PART No. | NOTES |
|---|---|---|---|---|
| M3 | 1N295 * | | 1N60 | Video Det. (Pigtail) |

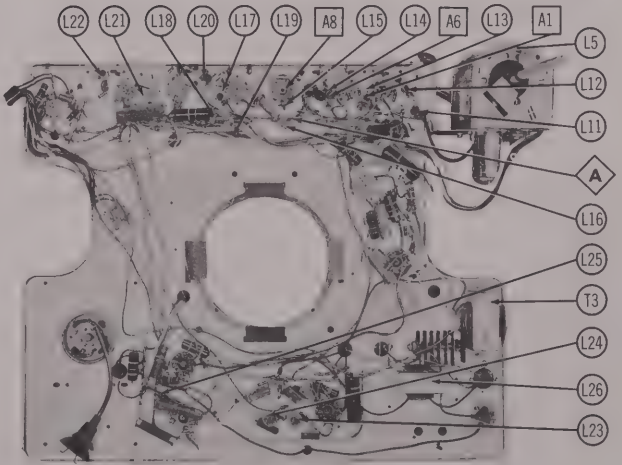
* Some versions may use crystal diode type CK706 or 1N60 in this application.

## MISCELLANEOUS

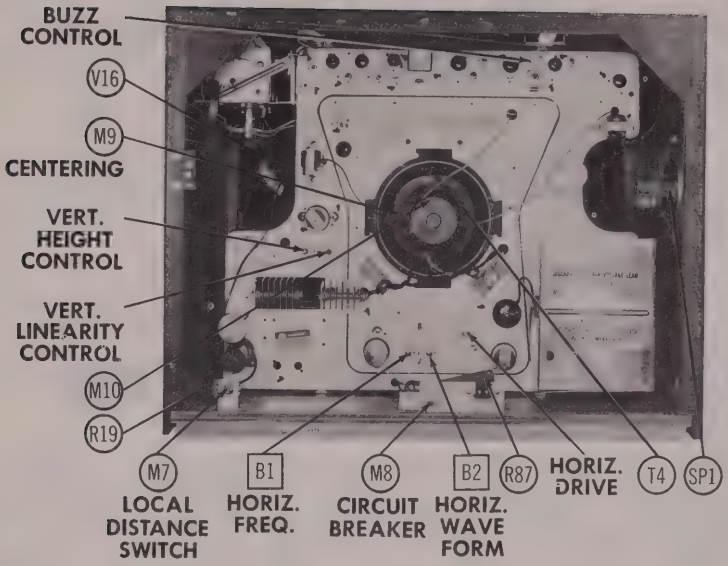
| ITEM No. | PART NAME | TRUETONE PART No. | NOTES |
|---|---|---|---|
| M4 | Tuner | 25A1133 | VHF; VHF Models |
| M5 | Tuner | 25A1134 | VHF-UHF; VHF-UHF Models |
| | Tuner | 25A1138 | VHF-UHF; VHF-UHF Models |
| M6 | Video Det. Assy. | 9A2370 | Includes M3, coils and capacitors |
| M7 | Switch | 2A459 | Local-suburban-fringe (SP-3 position, rotary, wafer type) |
| M8 | Circuit Breaker | 2A461 | Thermal Type-Used in later versions. |
| M9 | Centering Device | 2A435 | Includes deflection yoke (T4) rear cover |
| M10 | Ion Trap | 2A421 | |
| B3 | Trimmer Cap. | 17A271 | Horiz. Drive (170-700MMF) |




CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.




## CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Set the contrast control for normal contrast.

1. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

2. Connect the vertical amplifier of an oscilloscope to the junction of L23 and L24 thru a 10MMF capacitor. Connect the low side to chassis. Adjust the horizontal waveform slug (B2) until waveform similar to Fig. 6 is obtained. While making this adjustment keep the picture in sync with the horizontal hold control.

3. Turn the horizontal hold control fully clockwise. Turn B1 clockwise until picture is just ready to pull-in sync.

4. Turn the horizontal hold control fully counter clockwise. Picture should remain in sync. Momentarily remove the signal by switching off the channel and back again. Retouch B1 if necessary.

5. While receiving a signal from a station, turn the contrast control fully counter clockwise, turn the brightness up so that the picture is washed out in appearance. Turn the horizontal drive control (B2) clockwise until white vertical bars appear in the left center of the raster, then slowly turn B2 counter clockwise until the white bars just disappear.

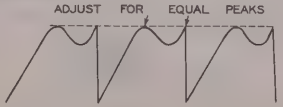



FIG. 6

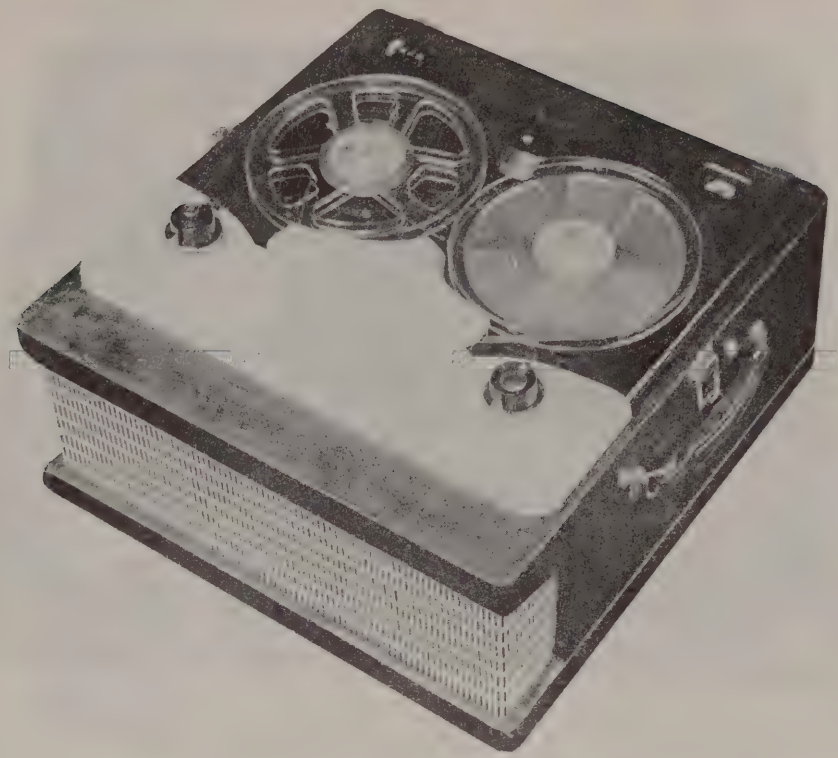


Figure 1

## GENERAL INFORMATION

The Webcor Models 2611 and 2612 Tape Recorders or designed to record two tracks of sound on the standard width (1/4") recording tape. The models use two motors and two Record-Play-back heads in conjunction with the Tape Directional Control to permit dual track recordings. This eliminates the operation of turning the reel over and rethreading the tape in order to use the second half.

Recordings may be made at either 7 1/2" per second for music and quality recordings or 3 3/4" per second where quality of the recording is not necessary such as speeches, popular music etc. Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from the microphone.

Using both tracks, the recording time is as follows:

| Reel Size | 3 3/4" Speed | 7 1/2" Speed |
|---|---|---|
| 5" (600 ft.) | 1 hour | 1/2 hour |
| 7" (1200 ft.) | 2 hours | 1 hour |

Models 2611 and 2612 have been designed to operate on 60 cycle. Operating voltage for the various units or as follows: Voltage from 105 to 120 volts are used in Models 2611-1, 2611-2, and 2612-2. Models using 220 to 235 volts are 2611-3, 2611-4, 2612-3 and 2612-4.

Manufactured by:

Webcor
5610 Bloomingdale Ave.
Chicago 39, Ill.

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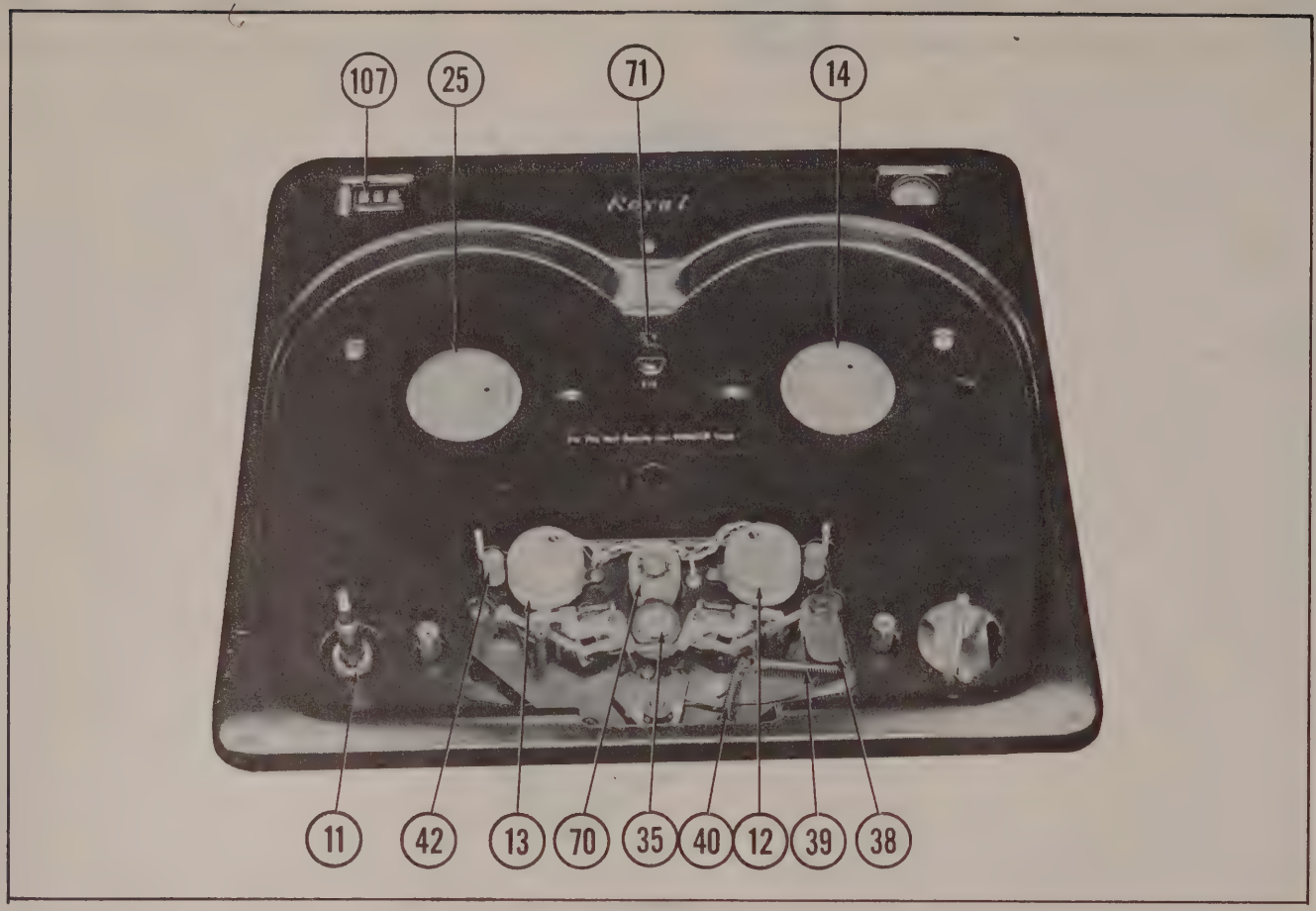



Figure 2

## SPECIFICATION

Bias-Erase Frequency: 65KC ± 5KC.

Weight: Model 2612, 49 lbs.
Model 2611, 42 lbs.

Size: Model 2612; 20 1/2" W, 10" H, 16 1/2" D.
Model 2611; 16 1/4" W, 10" H, 16 3/4" D.

Power Consumption: 95 Watts.

Wow-Flutter: Less than 1/2 percent.

Tape Speeds: 3 3/4 and 7 1/2 inches per second.

Response: 70 to 7,000 cycles at 3 3/4 inches per second.
70 to 10,000 cycles at 7 1/2 inches per second.

Signal to Noise: 35 db.

Speaker: Model 2611 has a 6 inch 9 ohm PM Speaker. Model 2612 has two 6 inch 3.2 ohm PM Speaker and one 4 inch 3.2 ohm PM Speaker.

Tube Complement: 2-12AX7, equalizer pre-amp. and phase inverter. 2-6V6, erase bias oscillator, monitor amp. and audio output. 1-6E5, record level indicator. 1-6X5, rectifier.

Motors: 4 pole shaded pole. (2 used).

Output Power: 4 watt undistorted, 7 watt peak.

## OPERATING INSTRUCTIONS

To Prepare The Webcor For Recording-

1. Remove the lid from the carrying case and place the recorder on a level table to insure proper action of the mechanism.

2. Connect the power cord (supplied with recorder) to the male plug located at the rear of the carrying case, then plug the other end into a convenient outlet supplying 110 volts AC.

3. Check the speed change adjustment (14) to insure the proper tape speed 3 3/4" or 7 1/2" per second.

4. Place a reel of tape on the left hand reel cup.

NOTE: The reel, when placed on the recorder, must unwind clockwise when the tape is pulled from it. Also the metallic coated side (dull side) must face toward the center of the reel. If the dull side of the tape faces outward, thread the tape on the machine with a half twist so the dull side faces inward on the take up reel, then wind all of the tape on the take up reel. When the tape is wound on the reel, remove the reel, turn it over and place the reel on the left hand cup (25).

5. Place an empty reel on the right hand cup, then thread the tape through the slot between the front and rear trim covers (4) and (5).

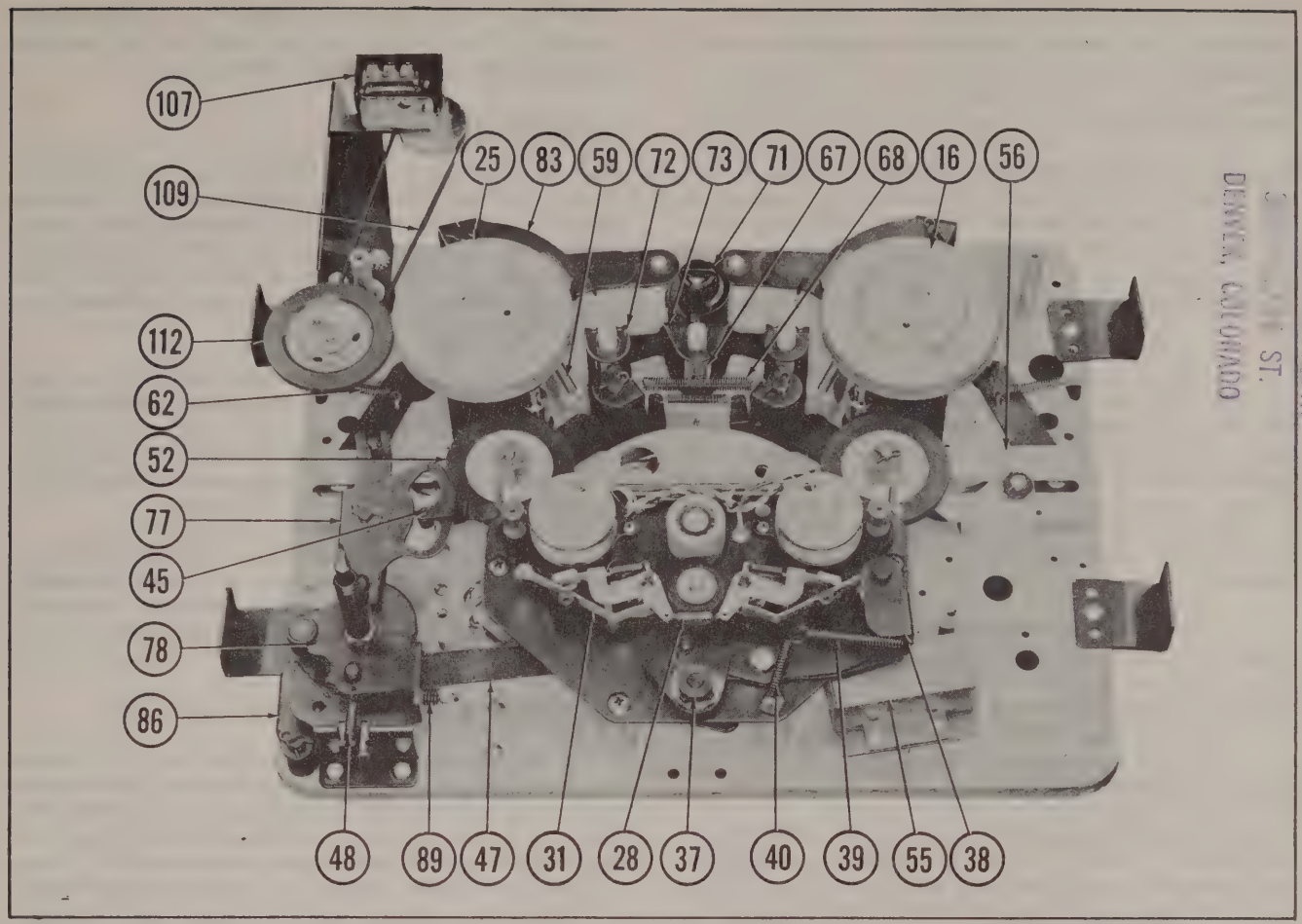



Figure 3

6. Insert the tape into one of the radial slots of the empty reel and by using a pencil, hold the tape in place and rotate the reel several revolutions clockwise to anchor the tape securely.

To Make A Recording-

1. After the recorder has been properly threaded, turn the On-Off-Volume control knob (1) to "On".

2. Plug the microphone into the input receptacle (three prong socket) located at the rear of the carrying case.

3. Push down on the "R" (record) safety button (6) and turn the control knob (7) to the (right).

4. Turn the Output selector switch to monitor if monitoring is desired when recordings are made direct from radio or record player. See ("Output Selector Switch")

5. Hold the microphone 8" to 12" from the mouth when making a recording.

6. Turn the volume control knob (1) clockwise until the Magic Eye recording level indicator just closes on the loud signals.

NOTE: Do not over record or the recording will sound distorted when played back.

7. After the tape has been recorded going one direction, a second sound track may be recorded by reversing the direction of the tape. This is done by holding the "R" (record) safety button (6) down and turning the control knob (7) in the opposite direction. Recording two tracks of program material on the tape doubles the playing time of a reel of tape with no loss in frequency response or quality.

NOTE: It is advisable to stop or reverse the direction of the tape before the tape is completely unwound from the reel. By doing this the tape will not have to be rethreaded.

Recordings Made Directly From Radio Or Record Player-

Radio programs should be recorded directly from the receiver circuit instead of by means of the loudspeaker and microphone. An accessory cord No. 2927 connected across the volume control of the receiver and the other end plugged into the input receptacle makes it possible to record independent of the volume control setting of the receiver.

This same cord can be used to record from a phonograph record player.

NOTE: The accessory cord No. 2927 includes the 22,000 ohm 1/2 watt resistor necessary between terminals 1 and 2 of the input plug.

To Stop The Recorder-

1. To stop the recorder anytime during operation merely turn the control knob (7) to the stop position. When the control knob is turned to Stop when a recording is being made the "R" (record) safety

button will move up. Therefore, to continue with a recording, this button "R" must be depressed when the control is turned.

Fast Wind Or Rewind-

1. To run the tape at fast speed in either direction push the control knob (7) down, then turn it to (R)ight or (L)eft as desired. Do not push down on the "R" (record) safety button (6).

To Play Back A Recording-

1. Properly thread the tape on the machine.

2. Turn the "Output" selector switch to "Normal" position. This will play the recorded material through the speaker of the recorder. Also see "Output Selector Control" under "Functions of Principal Parts".

3. Turn the tape control knob (7) to Right or Left position depending upon direction of tape travel required.

4. Adjust the Volume control (1) and Tone control (2) to suit.

NOTE: On-Off Volume control (1) is the round knob and the Tone control (2) is the wing knob.

Erasing Recorded Material-

There are two recording heads incorporated in the Webcor. When the tape winds on the right hand reel, the upper half of the tape is recorded by the Left Recording head. During this operation the right record head is inoperative. As the tape winds on to the left hand reel, the right recording head records the lower half of the tape. In this case the left recording head is inoperative. However, in each case the recording head is so constructed that a recording of the particular sound track is erased automatically before it reaches the recording coil. This makes it possible to make a new recording on tape that has been previously recorded.

If it is desired, any portion of the tape, or an entire reel, of recorded material can be erased as follows:

1. Rewind the tape to the start of the recording.

2. Turn the Volume control knob (1) down to "zero" volume.

3. Push down on the "R" (record) safety button (6) and turn control knob (7) to the position (R) or (L) to which the recording was made.

## FUNCTION OF PRINCIPAL PARTS

Index Control Assembly-

The index control assembly (78) is manually actuated when the control knob (7) is turned. Its function is as follows:

1. When the control knob is turned to the right or left, the following parts are actuated. The index control assembly (78), the control link (47) and in turn the crank (46). The cam (37) which is fastened to the hub of the crank (46) is then turned, forcing the pressure roller arm (38) inward, causing the pressure roller (35) to engage the capstan (70). Together the pressure roller (24) and capstan pulls the tape past the recording head at a constant speed.

Output Selector Switch-

1. With the Selector Switch in the "Normal" position, and the Record-Playback switch in Playback position, the 8 ohm secondary of the Output Transformer is connected to the speaker (or speakers) through the shorting section of the Output Jack. The insertion of a plug into the Output Jack would interrupt operation of the internal speaker.

2. With the Selector switch in the "External Amplifier" position, the 500 ohm winding of the Output Transformer is coupled to the Output Jack. To prevent overdriving of the input circuit of the external amplifier, a resistive voltage divider is employed consisting of the 10K (R31) and 470 ohm (R32) resistors.

3. With the Selector Switch in the "Monitor" position, the speaker is connected to the 8 ohm secondary with the Record-Playback switch in either Record or Playback position. This allows the operator to listen to the material being recorded.

Tape Speed Selector-

Turning the tape speed selector to the 7 1/2 inches per second position lowers the two rubber idler wheels which couple power from the Motors to the capstan assembly. Power is being taken from the large diameter of the motor shaft resulting in a faster speed. Turning the tape speed selector to the 3 3/4 inches per second position raises the two rubber idler wheels. Power is now being taken from the small diameter of the motor shaft resulting in a slower speed. A crank connected to the tape speed selector shaft actuates the equalizing switch mounted on the amplifier chassis.

NOTE: The control shaft (71) should be turned only when the tape direction control is at the stop position. Also recordings made at a particular speed must be played back at that speed.

On-Off-Volume Control-

The initial turn of this control activates the A. C. switch to apply operating voltage to the recorder. The tube filaments and the pilot lamp should light. Additional clockwise rotation will increase the volume.

Tone Control-

The tone control allows adjustment of the tone when a recording is being played back. This control has no effect when recording.

Record Button-

Depressing the record button (6) disengages the push rod and switch crank assembly (102) from the adjustable lever (101) so that turning of the Record-Playback Control (7) will not effect the position of the Record-Playback Switch.

Record-Playback Control-

1. Turning the Record-Playback Control to the "Right" position without depressing it or the Record Button will:

(a) Remove brake from both right and left brake drums.

(b) Apply pressure pads to left recording head.

(c) Move pressure roller (35) against capstan (70).

(d) Actuate head switch for proper function of recording heads.

(e) Move Record-Playback switch to Playback position.

(f) Apply power to right reel assembly from "right" motor.

(g) Apply power to capstan assembly (70) from "left" motor, through left idler wheel.

2. Turning the Record-Playback Control to the "Left" position without depressing it or the Record Button will:

(a) Remove brake from both right and left brake drums.

(b) Apply pressure pads to right recording head.

(c) Move pressure roller (35) against capstan (70).

(d) Actuate head switch for proper function of recording heads.

(e) Move Record-Playback switch to Playback position.

(f) Apply power to left reel assembly from "left" motor.

(g) Apply power to the capstan assembly from the "right" motor, through the right idler wheel.

3. Depressing the Record-Playback Control and turning it to the Right or Left position will cause the same mechanical actions to occur except that the Pressure Roller and Pressure Pads will not move. This allows the take-up reel to pull the tape at fast speed since the capstan does not now have control of tape speed. The Record-Playback switch remains in Record position.

4. When the Record-Playback Control is turned to Stop after being in the right position, there is heavier brake pressure applied to the left brake drum than is applied to the right brake drum.

5. When the Record-Playback control is turned to Stop after being in the left position, there is heavier brake applied to the right brake drum than is applied to the left brake drum. This brake action is called Memory Brakes.

How To Remove The Recorder From The Carrying Case-

1. Remove the four screws from bottom of cabinet.

2. Remove the screws on side of cabinet (these screw into the case mount brackets).

3. Remove control knobs by pulling up on them.

4. Remove front plastic cover by removing the two holding screws. (This provides a secure hold for lifting the front of the mechanism and prevents possible damage of the plastic cover).

5. On model 2612, it is necessary to remove the case mount bracket.

6. Lift up on the front of the mechanism, then grasp and lift the sides. Slide the mechanism toward the rear (this allows it to clear the speaker) as you lift it from the cabinet.

7. If necessary, unplug the speaker.

## ADJUSTMENTS

Mechanical adjustment will be found to consist of forming a mechanism or part into correct position if it is not functioning properly, or replacement of the part.

Pressure Roller-

The pressure roller (35) should be parallel with the capstan (70). With the spring clip holding the pressure roller (35) removed, the pressure roller should not climb up the capstan. If it is not parallel, a close fitting pipe may be inserted over the pressure roller shaft to supply leverage for bending it. The pressure roller may also be moved up on its shaft to provide a holding surface for bending. Care must be taken not to nick the shaft.

Adjusting Pressure Roller Cam (37)-

The pressure roller should engage the capstan (70) at the same time or an instant before the take up reel starts to rotate. The set screw holding the pressure roller cam (37) do not exactly center in the provided cavity on the shaft. Thus by loosening one set screw and tightening the other, the cam will rotate on its shaft. The cam should be adjusted so the engaging pin is evenly centered in the notch of the pressure roller cam (37) with the mechanism in "Stop" position.

Reel Arm Guides (59A) Adjustment (See Figure 2)-

These reel arm guides act as a sliding hold for the reel arm assemblies (60) and (84). If these are bent up too far, it will cause a rattling sound when running. If they are bent down too far, it will cause the reel arm assembly to bind. This will prevent the rubber clutch wheel (21) from moving against the motor shaft and the particular reel affected will not turn. Grease should be applied to the reel arm guides (59A).

Pressure Pads Adjustment-

The pressure pads (31A and 26A) must clear the recording head housing and rest firmly and freely against the Record-Playback head (12 and 13). The pressure pad arms are made of soft metal which can easily be formed to properly position the pads against the heads.

Idler Wheel Adjustment-

The idler wheels (52) should contact the capstan drum (70) squarely and not at an angle. With the tape speed selector (71) set to 3 3/4 inches per second, the

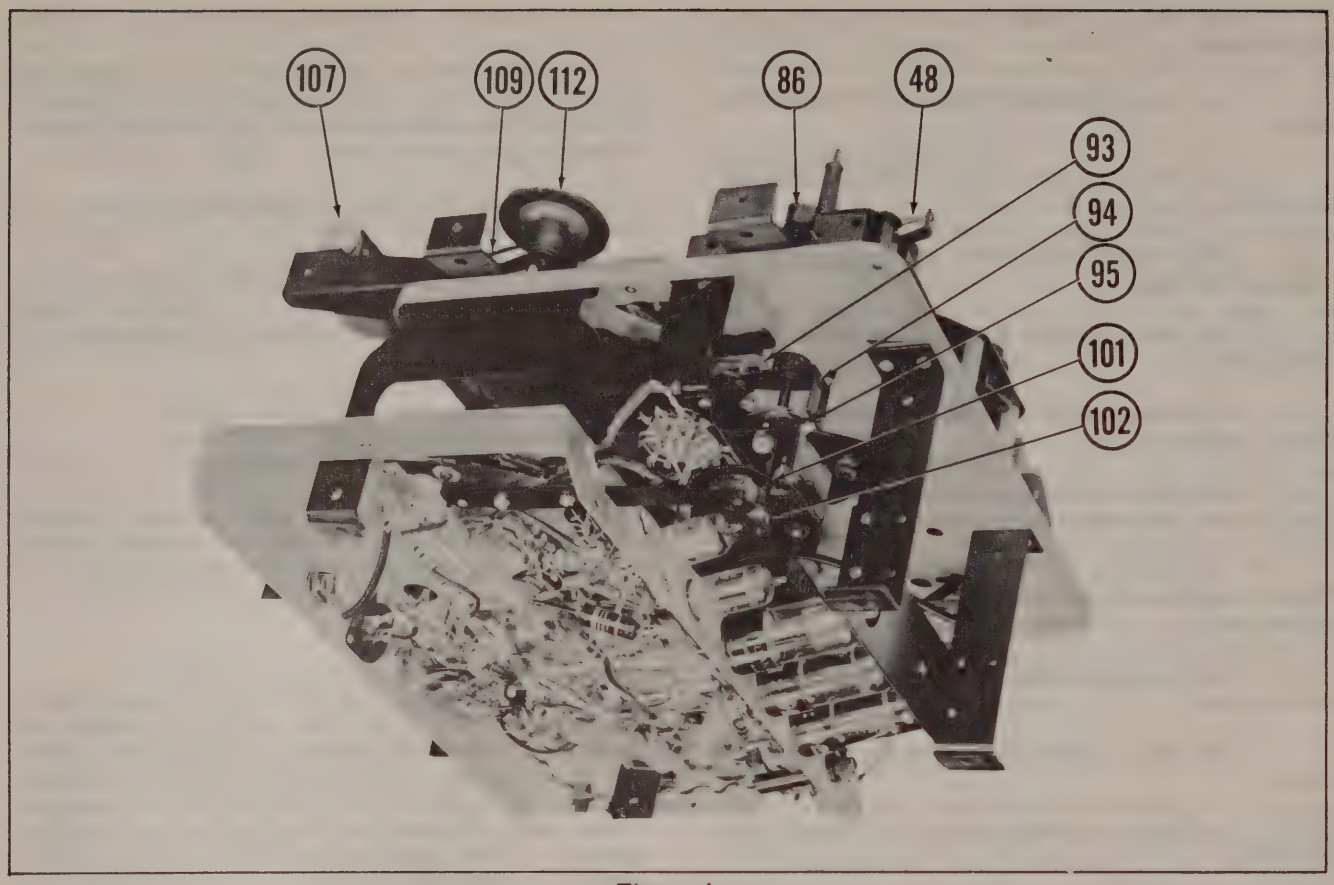



Figure 4

idler wheels (52) should contact the small diameter portion of the motor shaft. If the idler wheels are too low, they will also rub on the large diameter of the motor shaft. The idler wheels arm (54) can be adjusted to place the idler wheels (52) in correct position. The number of washers (53) under the wheels may be varied to prevent vertical play.

## ELECTRICAL ADJUSTMENTS

Eye Adjustment-

The purpose of the magic eye tube is to indicate when the proper level of signal is being applied to the recording head. If this circuit is mis-adjusted or not operated properly, it will cause an incorrect level of signal to be applied to the recording head. This can result in a weak recording or an overdriven distorted recording. Eye adjustment is accomplished as follows:

1. Connect leads of No. 2927 input cord to output lugs of audio generator and insert plug into input jack of recorder.

2. Set audio generator to 1000 cycles. Adjust output control of generator until a reading of 1 volt AC is obtained with a V. T. V. M. at the output lugs of the audio generator.

3. Set selector switch to Monitor.

4. Set speed selector to 7 1/2 inches per second.

5. Connect a 9 ohm no-inductive 25 watt resistor to the leads of No. 2928 output cord or to an ordinary microphone plug. Insert plug into output jack of recorder.

6. Turn "Volume" control until a reading of 1.2 volts AC is obtained across the 9 ohm resistor.

7. Adjust eye control (R4) until eye just closes.

Head Alignment-

1. Aligning left head. Place reel of head alignment tape on left reel shaft. Place empty reel on right reel shaft. Thread the tape as described under "To Prepare The Webcor For Recording".

2. Set selector switch to "Normal".

3. Set speed selector to 7 1/2 inches per second.

4. Connect a 9 ohm non-inductive 25 watt resistor to the leads of No. 2928 output cord and insert plug into Output Jack. Connect V. T. V. M. across the 9 ohm resistor.

5. Turn "Volume" and "Tone" control maximum clockwise.

6. Turn Record-Playback control to "Right" position.

CAUTION: Do not depress Record Button as this will erase the pre-recorded tape.

7. Loosening one adjustment screw (10A) and noting if the output raises or drops, will give an indication of the direction the head should be tilted. By adjusting both screws the proper position giving maximum meter reading will be found. If output reading exceeds 4 volts, turn volume control counterclockwise to reduce reading below 4 volts. Again carefully adjust head for maximum output.

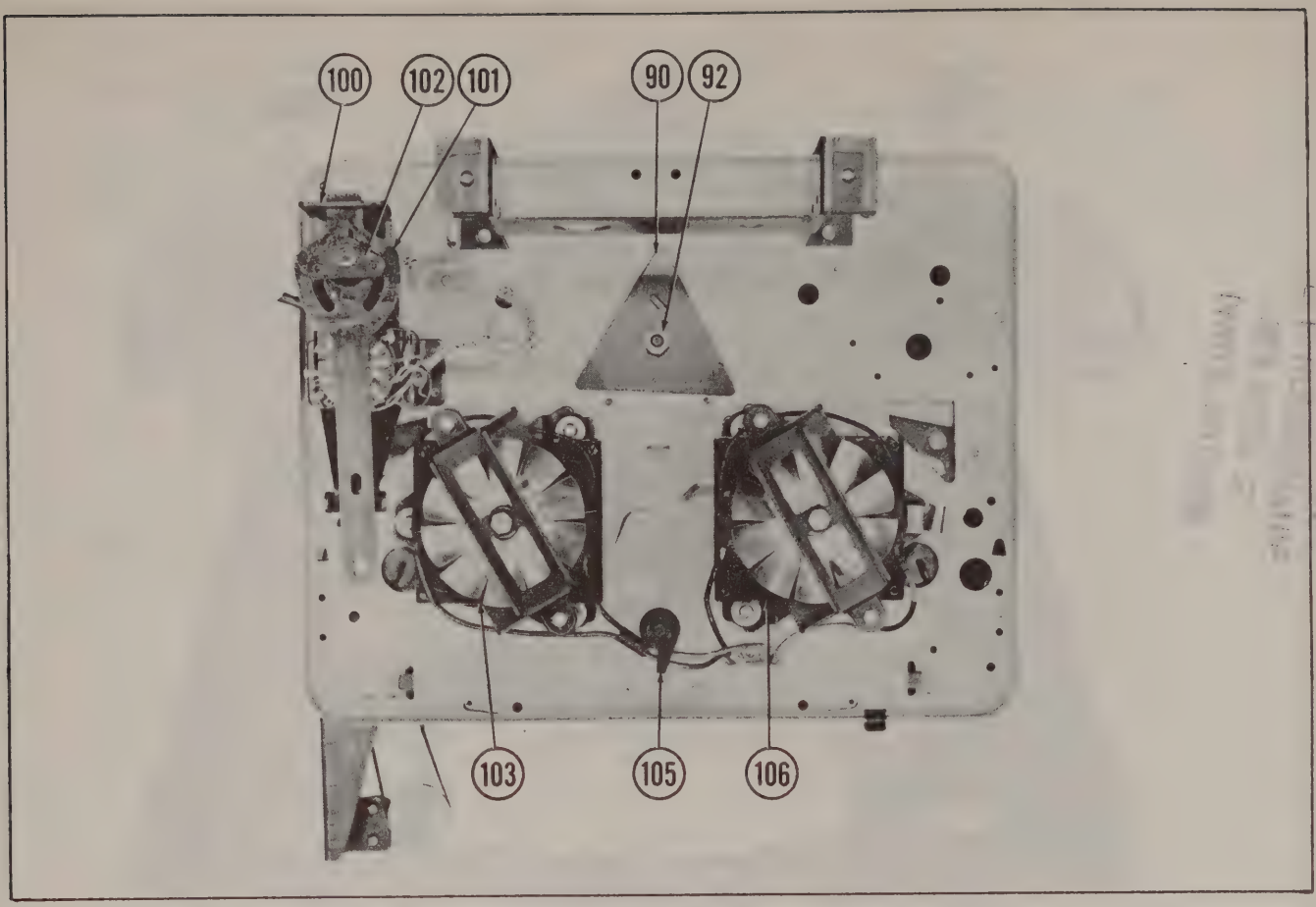



Figure 5

1. Aligning right head. Let control and switches remain as used in aligning left head.

2. Turn Record-Playback control to "Left" position.

CAUTION: Do not depress "Record" button as this will erase the pre-recorded tape.

3. Follow same procedure in step (7) as for aligning left head.

To Measure Bias-Erase Current Indirectly With A. C. Voltmeter-

1. Remove rear plastic cover to expose heads.

2. Depress Record Button and turn Record-Playback control to "Left" position.

3. Connect leads of A. C. voltmeter across the connections to which the white and black leads connect to the right head. A reading of approximately 3 volts A. C. should be obtained when using a meter having a sensitivity of 1000 ohm per volt on its A. C. function. If a VTVM is used, a reading of 3. 8 to 4 volts A. C. should be obtained.

4. To check the left head, depress the record button and turn Record-Playback control to the "Right" position. Connect A. C. voltmeter leads across the connections to which the brown and white leads connect on the left head. A reading of approximately 3 volts A. C. should be obtained with a meter having a sensitivity of 1000 ohm per volt on its A. C. function. If a V. T. V. M. is used, a reading of 3. 8 to 4 volts A. C. should be obtained.

## TROUBLES

Motor Fails To Operate-

(a) Motor defective electrically.

(b) Bent or binding motor shaft.

(c) Motor bearings in need of oil.

Motor Operates Only In Stop Position-

(a) Capstan shaft or drum bent and binding.

(b) Improper operation of automatic stop (See Figure 2).

Capstan Fails To Rotate In Play And Record, But Motors Operate-

(a) Broken or disconnected spring (68).

(b) Oil on idler wheels (52).

Erase And Recording Head Pads Fail To Move Properly In "Stop", "Play" or "Record"-

(a) The two springs in pressure pad assembly pad assembly (26 and 41) missing or broken.

(b) Check tension spring (28) connecting pad assemblies (26 and 41).

(c) Binding pad assembly.

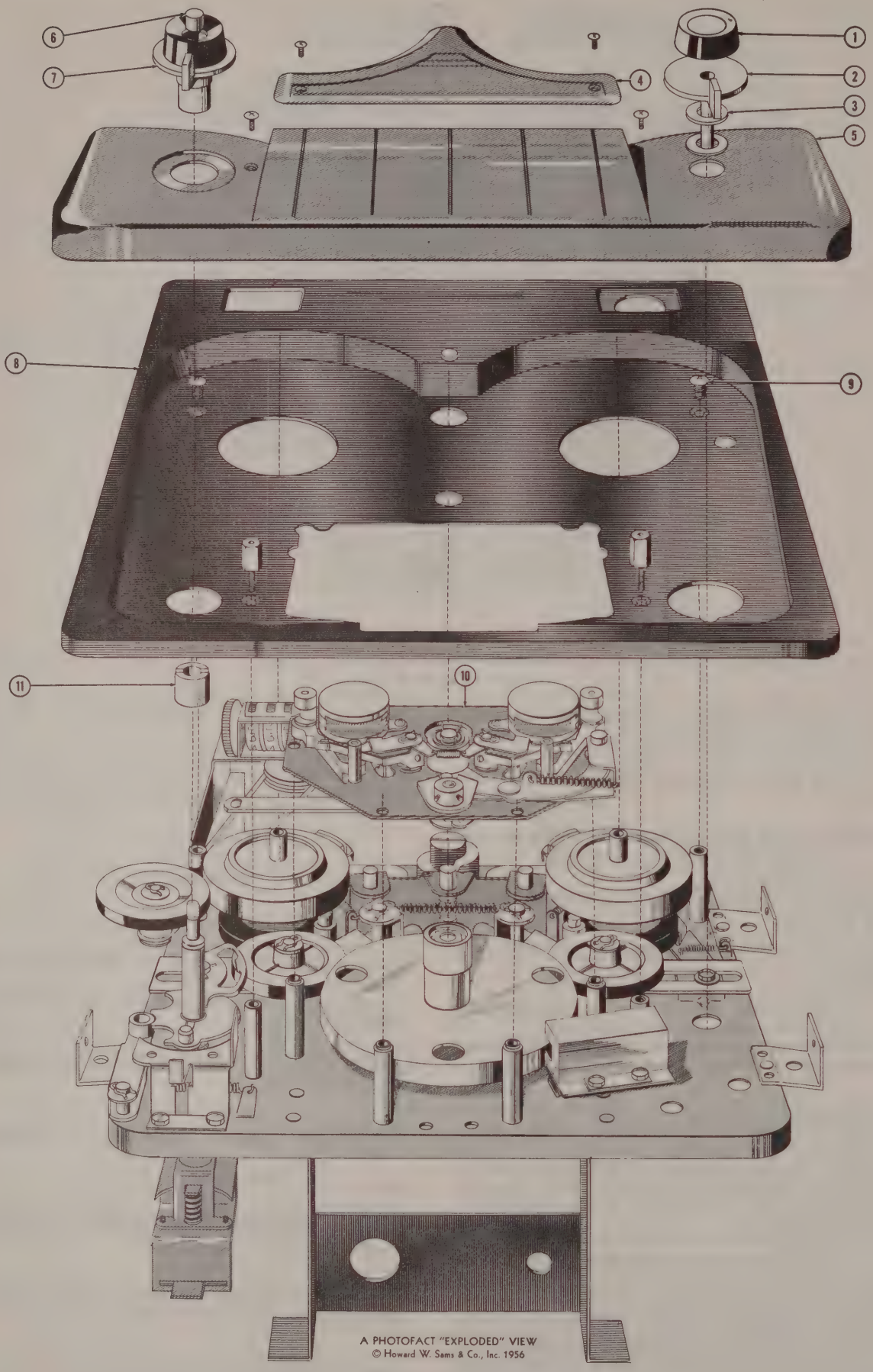



**Figure 6A. Exploded View Of Baseplate.**

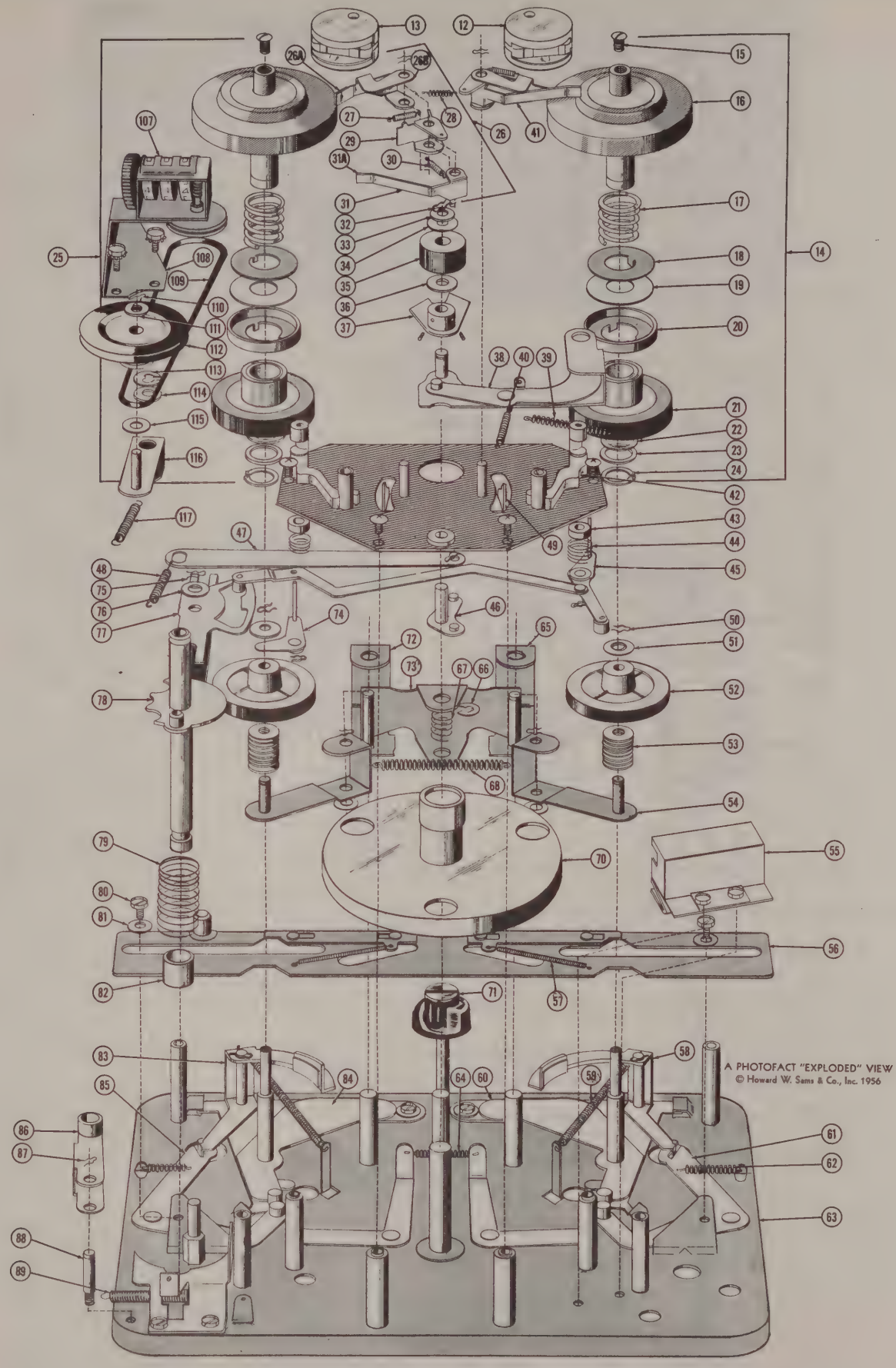



Figure 6B. Exploded View Of Parts Above Baseplate.

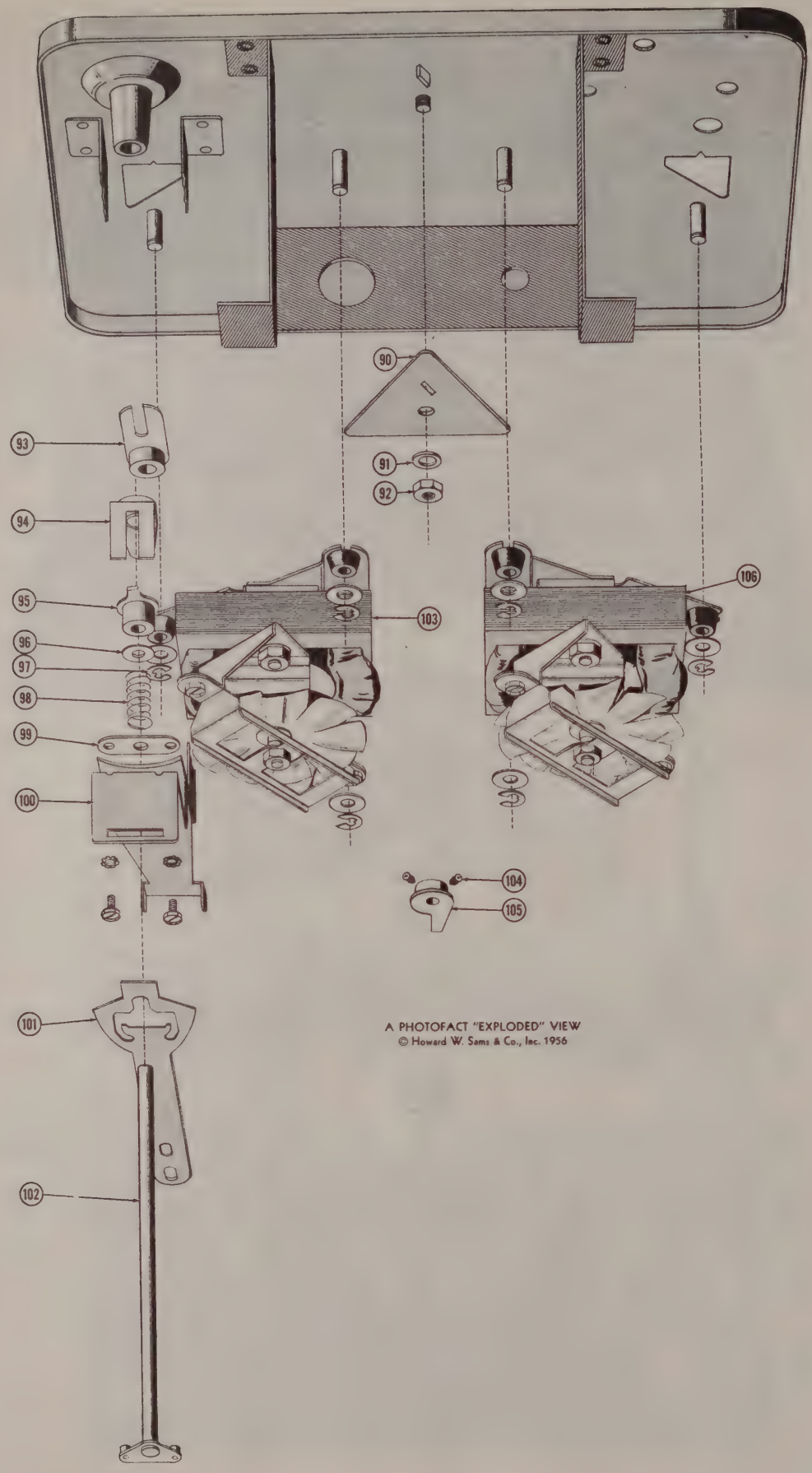
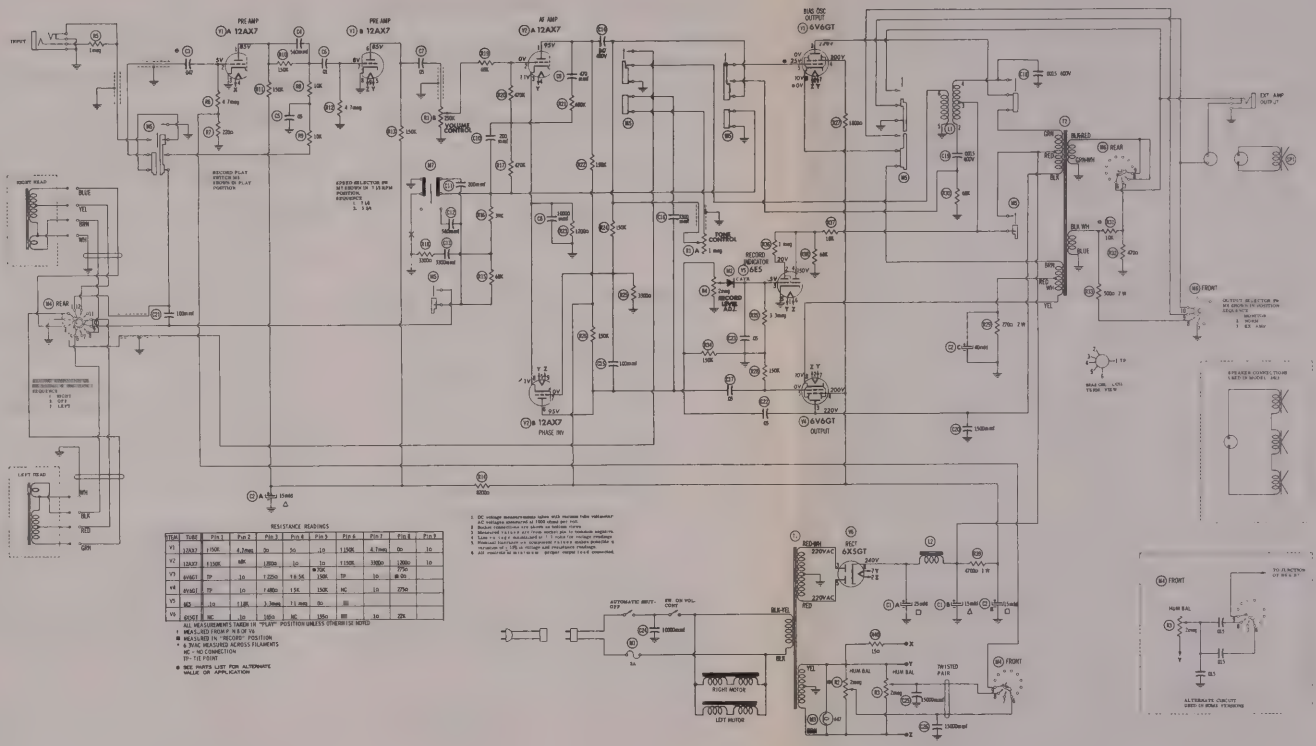



Figure 6C. Exploded View Of Parts Below Baseplate.




RESISTANCE READINGS

| TUBE | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 12AX7 | 1150K | 4.7meg | 2Ω | 3Ω | .1Ω | 1150K | 4.7meg | 0Ω | 1Ω |
| V2 | 12AX7 | 1150K | 68K | 1200Ω | 1Ω | 1Ω ● 30K | 1150K | 330Ω | 1300Ω ● 27K | 1Ω |
| V3 | 6V6GT | 2P | 1Ω | 1225Ω | 18.5K | 150K | TP | 1Ω | 48 Ω | |
| V4 | 6V6GT | TP | 1Ω | 1480Ω | 13K | 150K | NC | 1Ω | 275Ω | |
| V5 | 6E5 | 1Ω | 1.1M | 1.3meg | 11 meg | 0Ω | ∞ | | | |
| V6 | 6X5GT | NC | 1Ω | 340Ω | NC | 1250Ω | ∞ | 1Ω | 22K | |

ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE NOTED

1. MEASURED FROM P.N.B. OF V6
2. MEASURED IN "RECORD" POSITION
3. 3VAC MEASURED ACROSS FILAMENTS
4. NC - NO CONNECTION
5. TP - TIE POINT
6. SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter
2. DC voltages measured at 1000 ohms per volt
3. Bullet (resistance) are shown as below notes
4. Measured values are from motor pin to ground except
5. Measured between pin 1 and ground with 1000 ohm potentiometer
6. Measured between pin 1 and ground with 1000 ohm potentiometer
7. Measured between pin 1 and ground with 1000 ohm potentiometer
8. All resistor values are ± 10% unless otherwise noted.

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328-13

Pressure Roller Fails To Engage Capstan In "Play" Or "Record"-

(a) Broken or disconnected tension spring (39).

(b) Binding pressure roller assembly (38).

(c) Loose set screw in pressure roller cam (37).

Take Up Reel Fails To Accept Tape At Required Rate-

(a) Faulty clutch assembly (16).

(b) Binding take up spindle.

Operation Of Speed Selector Does Not Change Tape Speed-

(a) Binding assemblies (54 and 73) or missing spring (67) preventing idler wheels (52) from moving up and down with turning of "Speed Selector".

Push Rod And Switch Crank Assembly Fails To Engage Or Disengage Adjustable Lever When Recording Button Is Actuated-

(a) Adjustable lever (101) misadjusted.

(b) Compression spring (98) broken or missing.

Take Up Reel Fails To Yield Tape In "Record" Or "Play"-

(a) Brake pad assemblies operating improperly.

(b) Faulty clutch assembly (16).

(c) Dirty or oil on clutch rubber drive wheel (21).

(d) Binding or bent take up reel spindle.

(e) Broken or missing spring (59).

(f) Reel arm guides (59A) to tight.

Weak Or No Recording And Playback Of Tape-

(a) Improper alignment of recording heads (See "Head Alignment").

(b) Worn pressure pads (31A and 26A).

(c) Check for broken or missing tension springs (27 and 30) on pressure pad assemblies (26 and 41).

(d) Defective head switch.

(e) Defective heads (12 and 13).

(f) Wire connection broken at head.

Supply Reel Fails To Yield Tap In "Record" Or "Play"-

(a) Binding or bent supply reel spindle.

(b) Improperly operating brake arms (83 and 58).

Failure To "Fast Wind"-

(a) Improperly operating brake arms (83 and 58).

(b) Oil on clutch rubber drive wheel (21).

(c) Motor fails to operate.

(d) Faulty clutch assembly (16).

(e) Broken or missing spring (59).

(f) Reel arm guides (59A) too tight.

Supply Reel Spills Tape When Record-Playback Control Is Turned To "Stop"-

(a) Worn brake pad on supply reel.

(b) Check brake action.

Record-Playback Control Cannot Be Turned In One Direction-

(a) Head switch crank (93) disengage from main guide crank (94).

Brakes Do Not Operate Properly-

(a) Broken or missing tension springs (57) on sliding cam plate assy. (56).

(b) Screw holding sliding cam plate assy. (56) to tight.

Counter Does Not Register-

(a) Counter belt (109) broken.

(b) Broken or missing spring (117).

Tape Speed Slower Than Normal Or Poor Tape Travel-

(a) Worn or pitted heads (12 and 13).

(b) Worn idler wheels (52).

(c) Heads excessively tilted during alignment.

(d) Pressure pads not positioned properly.

Tape Spill-

(a) Pressure roller cam (37) misadjusted.

(b) Brake not operating properly.

(c) Pressure pads not positioned properly.

## LUBRICATION

The Webcor has been well lubricated at time of manufacture and should give long service without additional lubrication; however, in case of extreme usage, replacement of parts or when it is needed, as indicated by binding of parts, the recorder should be cleaned with carbon tetrachloride and lubricate as follows:

CAUTION: Do not allow carbon tetrachloride to come in contact with the rubber drive wheels as carbon tetrachloride will seriously damage rubber surface. Rubber surfaces should be cleaned with a alcohol.

Use a drop of two of No. 10 oil on the following:

1. Motor Bearings.

2. Brake shoe (58) and (83) pivot pins.

3. Bearing surfaces of drum and wheel assemblies (14) and (25).

4. Bearing surfaces of the idler wheels (52).

5. All pivot points of the following-idler mounting arms (54), crank arms (65) and (72), and the speed change lever (73).

Use a good high temperature lubricant on the following:

1. Sliding surfaces of the cam and slide assembly (56).

2. Frictional contacts of the reel arms (84) and (60).

3. The point of contact between the brake levers (58) and (83) and actuating levers (61) and (85).

4. Contour of cam (37).

5. Frictional contact of the pressure roller arm assembly (38).

6. Roller and pivot point of the arm and roller assembly (86).

7. Contact surfaces of items (78), (77), (94), and (93).

CAUTION: Avoid over lubrication, as this may cause the parts to gum up, thus preventing the mechanism from functioning properly. Do not allow grease or oil to come in contact with any of the rubber tires or any of their contacting surfaces. If grease or foreign material comes in contact with these surfaces, clean them with alcohol.

# PARTS LIST AND DESCRIPTIONS

## TUBES (GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | Preamplifier | 12AX7 | |
| V2 | AF Amplifier-Phase Inv. | 12AX7 | |
| V3 | Output-Bias Osc. | 6V6GT | |
| V4 | Output | 6V6GT | |
| V5 | Record Indicator | 6E5 | |
| V6 | Rectifier | 6X5GT | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA WEBCOR PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ■25 | 450 | | AFH2-50 | | | | D-220 | TVL-3778 |
| B | ▲15 | 350 | | | | | | | |
| C2A | ▲15 | 250 | | AFH3-119 | C094 | FP345.5 | TMT105 | T-545 | TVL-3675 |
| B | ■15 | 350 | | | | | | | |
| C | 40 | 25 | | | | | | | |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA WEBCOR PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C3 | .047 | 400 | | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | Note #1 |
| C4 | 560 | | | SI560 | | | | | | |
| C5 | .05 | 400 | | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C6 | .01 | 400 | | BPD-01 | D6-103 | CUB4S1 | GP3-333-103 | PT411 | 4TM-S1 | |
| C7 | .05 | 400 | | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C8 | 10000 | | | BPD-01 | DD-103 | K082 | 811-01 | DC511 | 5HK-S1 | |
| C9 | 470 | | | SI470 | D6-471 | TP46 | GP2K-471 | UC-5347 | 5GA-T47 | |
| C10 | 200 | | | SI200 | D6-201 | TP38 | GP2K-201 | UC-532 | 5GA-T2 | |
| C11 | 200 | | | SI200 | D6-201 | TP38 | GP2K-201 | UC-532 | 5GA-T2 | |
| C12 | 560 | | | SI560 | D6-561 | TP48 | GP2K-561 | UC-5356 | 5GA-T56 | |
| C13 | 3300 | | | SI3300 | D6-332 | TP61 | GP2-333-332 | UC-5233 | 5HK-D33 | |
| C14 | .047 | 400 | | BPD-05 | DF-503 | CUB4S47 | | PT4147 | 4TM-S47 | |
| C15 | 100 | | | SI100 | D6-101 | TP34 | GP1K-101 | UC-531 | 5GA-T1 | |
| C16 | 3300 | | | SI3300 | D6-332 | TP61 | GP2-333-332 | UC-5233 | 5HK-D33 | |
| C17 | .05 | 400 | | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C18 | .0015 | 600 | | SI1500 | D6-152 | CUB6D15 | GP2L-152 | PT6215 | 6TM-D15 | |
| C19 | .0015 | 600 | | SI1500 | D6-152 | CUB6D15 | GP2L-152 | PT6215 | 6TM-D15 | |
| C20 | 1500 | | | SI1500 | D6-152 | TP54 | GP2L-152 | UC-5315 | 5HK-D15 | |
| C21 | 100 | | | SI100 | D6-101 | TP34 | GP1K-101 | UC-531 | 5GA-T1 | |
| C22 | .05 | 400 | | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C23 | .05 | 400 | | BPD-05 | DF-503 | CUB4S5 | | PT415 | 4TM-S5 | |
| C24 | 10000 | 900 | | P1088N-01 | DD-103 | CUB16S1 | | PT1611 | 10TM-S1 | |
| C25 | 15000 | | | BPD-015 | DD16-153 | CUB6S15 | 821-015 | PT6115 | 5HK-S15 | |
| C26 | 15000 | | | BPD-015 | DD16-153 | CUB6S15 | 821-015 | PT6115 | 5HK-S15 | |

Note #1. Some versions may use .01MFD unit in this application.

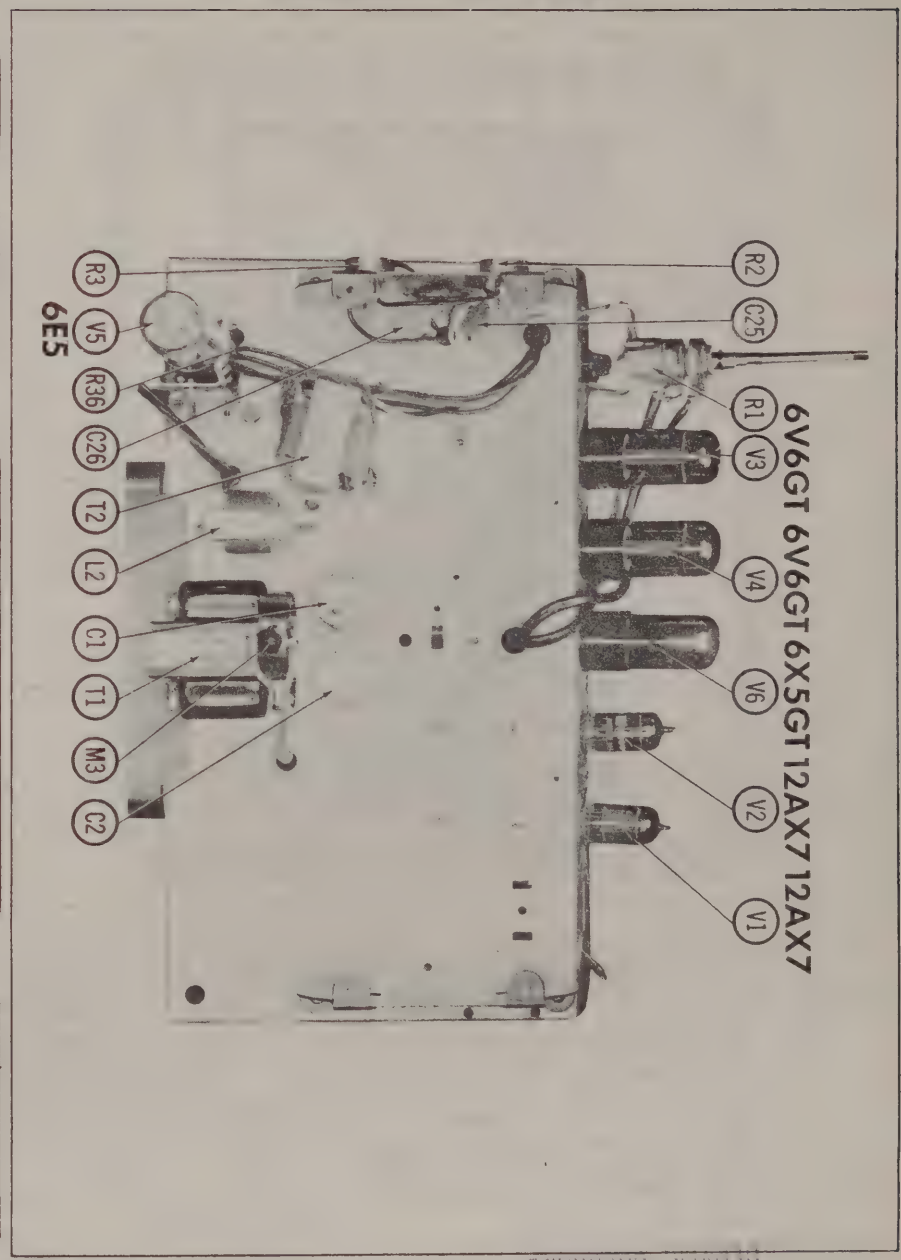
## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA WEBCOR PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 1Meg | 1/2 | 31P100 | F1-52 | | ♦ | UF16A | Tone (Panel) |
| B | 250KΩ | 1/2 | | R2-35 | | | UR254A | Volume (Rear) |
| C | Switch | | | KB-1 | | | US-26 | Attach to R1B |
| D | Cover | | | KB-5 | | | | Attach to R1C |
| R2A | 2Meg | 1/2 | 31P095 | BX-75 | A47-2Meg-S | Q11-139 | PTA26L | Hum Balance Note |
| B | Shaft | | Not Req. | Not Req. | FKS-1/2 | RQ | Not Req. | Attach to R2A |
| R3A | 2Meg | 1/2 | 31P095 | BX-75 | A47-2Meg-S | Q11-139 | PTA26L | Hum Balance |
| B | Shaft | | Not Req. | Not Req. | FKS-1/2 | RQ | Not Req. | Attach to R3A |
| R4A | 2Meg | 1/2 | 31P095 | BX-75 | A47-2Meg-S | Q11-139 | PTA26L | Record Level Adjustment |
| B | Shaft | | Not Req. | Not Req. | FKS-1/2 | RQ | Not Req. | Attach to R4A |

♦ Concentrikit equivalent K-2 Base Elements and Shafts B13-137 P1-200 (Panel)
New, QJ-1024R 76-1 Switch B13-130 R2-306 (Rear)
Note not used in some versions.

PARTS LIST CONTINUED ON PAGE 16

## CHASSIS—TOP VIEW



| Ref. No. | Part No. | Description |
|---|---|---|
| 98 | 46P238 | Compression Spring |
| 99 | 45P1456 | Centering Plate |
| 100 | 11X894 | Bracket Assembly |
| 101 | 45P1458 | Adjustable Lever |
| 102 | 11X1438 | Push Rod and Switch Crank Assy. |
| 103 | 15X113 | Left Motor (For 117V. Models) |
| | 15X129 | Left Motor (For 220V. Models) |
| 104 | 26P1450 | Set Screw |
| 105 | 11X662 | Compensation Switch Crank Assy. |
| 106 | 15X112 | Right Motor (For 117V. Models) |
| | 15X128 | Right Motor (For 220V. Models) |
| 107 | 74P002 | Counter |
| 108 | 45P2014 | Counter Support Bracket |
| 109 | 72P005 | Counter Belt |
| 110 | 50P125 | Spring Clip |
| 111 | 25P430 | Washer |
| 112 | 11X1441 | Counter Rubber Wheel Assy. |
| 113 | 50P253 | Clip |
| 114 | 25P488 | Washer |
| 115 | 25P656 | Washer |
| 116 | 11X1439 | Counter Idler Arm and Stud |
| 117 | 46P434 | Tension Spring |

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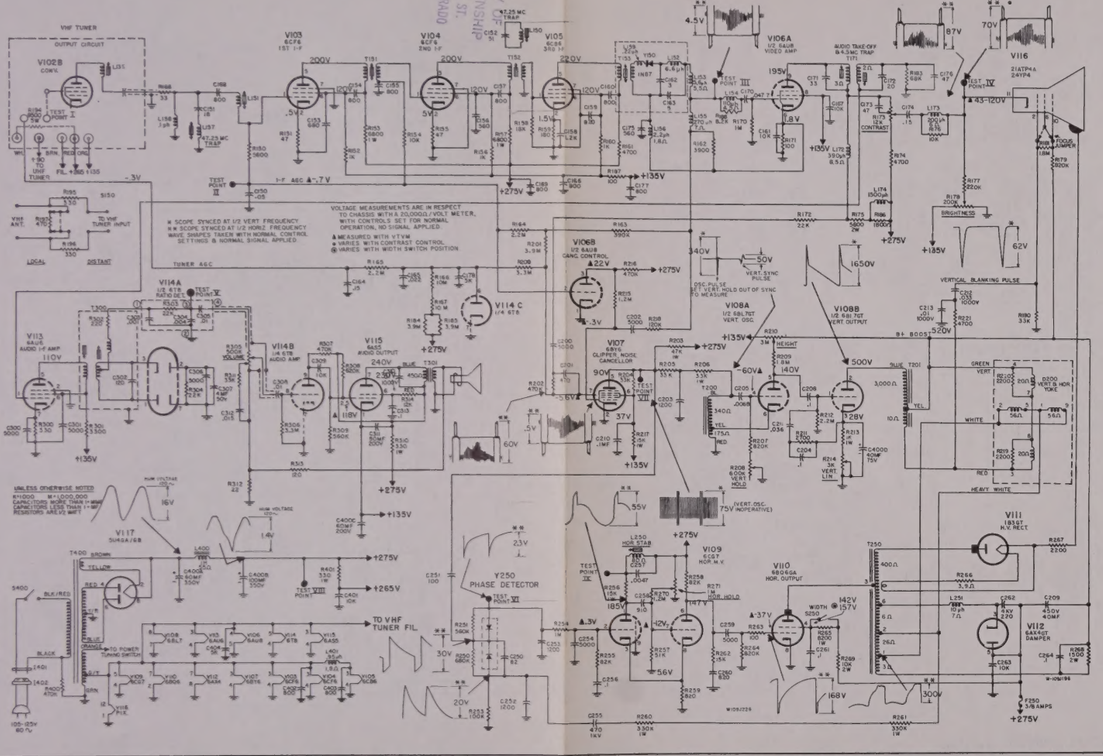

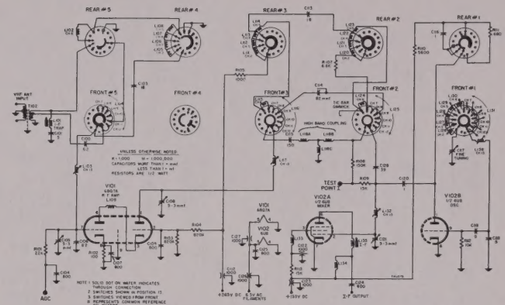

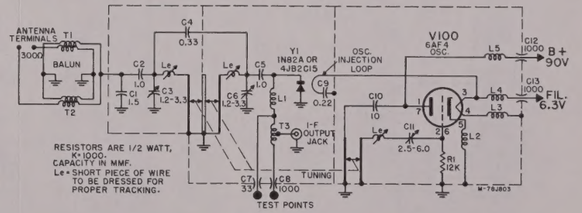


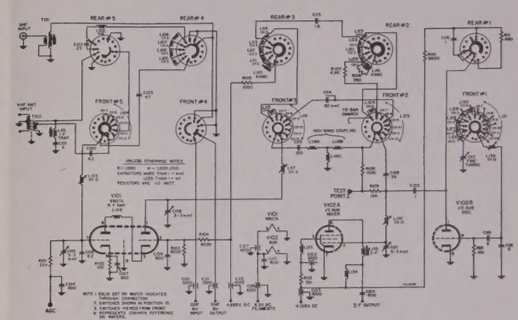

GENERAL ELECTRIC MODELS

21C137
21C138
21C160
21C161
21C162
21C172
21T050
21T060
21T061
24C182
24C183 ("U" line )

SCHEMATIC COURTESY OF GENERAL ELECTRIC COMPANY

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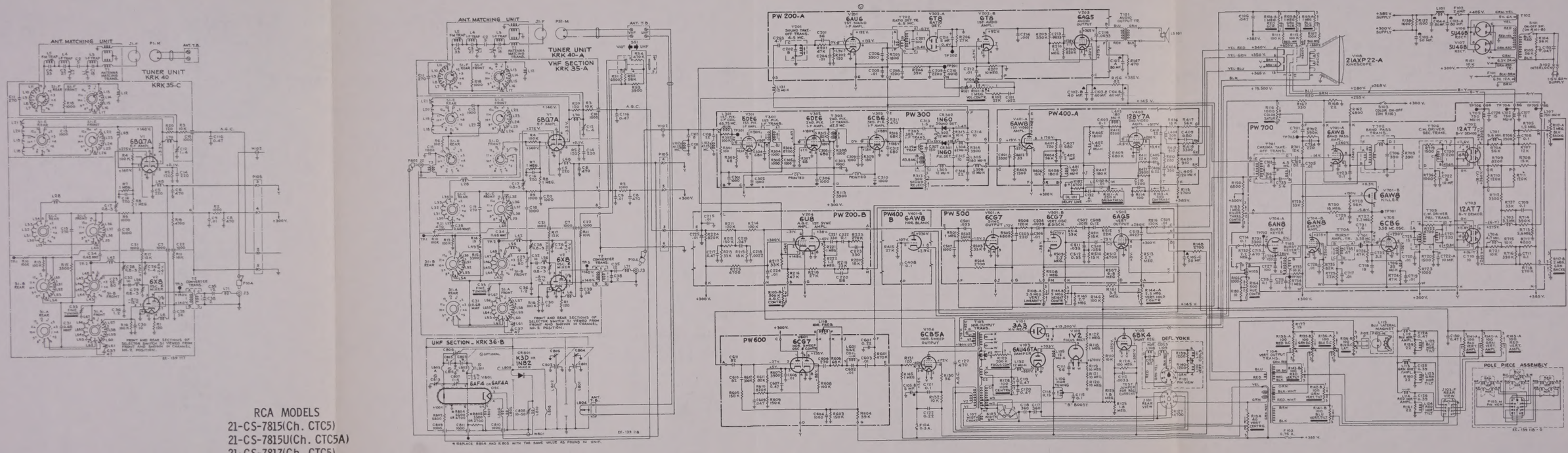


RCA MODELS
21-CS-7815(Ch. CTC5)
21-CS-7815U(Ch. CTC5A)
21-CS-7817(Ch. CTC5)
21-CS-7817U(Ch. CTC5A)

SCHEMATIC COURTESY OF RADIO CORPORATION OF AMERICA

RCA VICTOR television division